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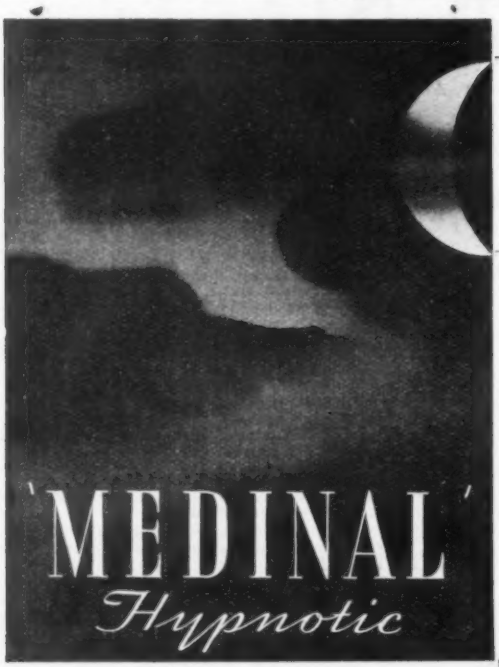

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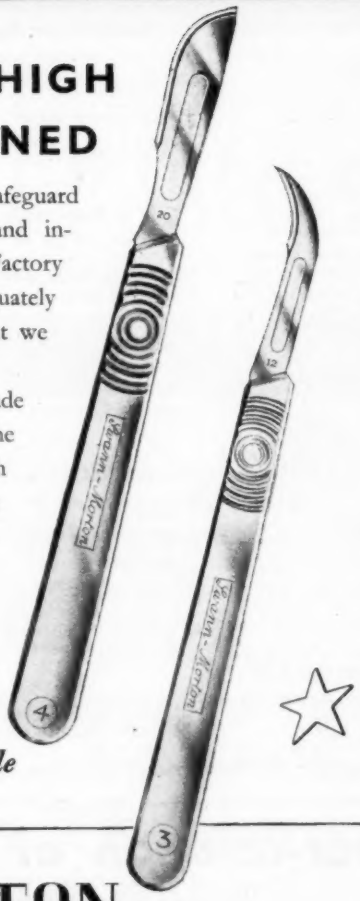

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CASE-RECORDS

CASE 1.—Male, aged 60. Seen 2½ hours after injury. Right leg completely destroyed from 2 in. below knee and small hole in abdominal wall, though splinter had not entered peritoneal cavity. Tourniquet had been applied 15 min. after injury and morphia gr. ¼ given 15 min. later. Mentally dull but rational, no pain, no thirst, pallor ++, cyanosis of lips and fingers ++, no sweating, very cold. Hb finger 100%, vein 104%, hæmatocrit 40%. Pulse impalpable, B.P. not recordable.

After 1 pint plasma in 15 min. P. 108, B.P. 40/?. After 2nd pint plasma in 15 min. P. 110, B.P. 60/40, Hb finger 70%, vein 60%, hæmatocrit 25·5%. After 3rd pint plasma in 12 min. P. 160, B.P. 80/50. After 4th pint plasma in 23 min. P. 120, B.P. 105/55, Hb finger 47%, vein 45%, hæmatocrit 19%. Had by now greatly improved in colour; pain in legs and abdomen. Had to wait for admission to theatre on account of congestion, during which time B.P. fell to 80/50 and 1 pint blood administered. Left theatre with B.P. 100/70. Amputation of leg through upper third of thigh, abdominal wall opened and f.b. removed. Anæsthetic G.O.E. After 24 hours condition excellent; P. 78, B.P. 115/70, Hb finger 52%.

CASE 2.—Male, aged 26. Seen 3 hours after injury. Wound in left loin 8 in. in diameter; multiple superficial wounds, abdominal wound, small wound right shoulder. Morphia gr. ¼ 40 min. after injury. Warmed with electric blanket for 45 min. before transfusion. Mentally clear and rational, pain slight, thirst ++, pallor ++, cyanosis slight, no sweating, hands very cold. P. 86, B.P. 50/30.

After 1 pint blood in 20 min. P. 92, B.P. 70/60. After 2nd pint blood in 20 min. P. 94, B.P. 80/75. After 3rd pint blood in 20 min. P. 100, B.P. 95/75, colour greatly improved, operation started: débridement, intestinal resection. At end of operation P. 90, B.P. 90/70. After 24 hours P. 100, B.P. 110/80; general condition good.

CASE 3.—Male, aged 24. Seen 3½ hours after injury. Multiple small injuries of back, legs and arms, gaping hole in right buttock 9 in. in diameter, buttock almost completely removed, perforating wound left wrist joint. Morphia gr. ¼ 1½ hours after injury. Warmed with electric blanket for 1½ hours before transfusion. Mentally clear, pain ++, thirst +, pallor ++, cyanosis ++, sweating slight, T. 95° F., P. 82, B.P. 40/30, Hb ear 120%, vein 100%, hæmatocrit 43%.

After 1 pint plasma in 20 min. P. 100, B.P. 70/40. After 2nd pint plasma in 20 min. P. 120, B.P. 80/45. After 3rd pint plasma in 20 min. P. 128, B.P. 100/55, Hb, ear 80%. Greatly improved but pallor still extreme; 1 pint blood given in 30 min. P. 120, B.P. 100/60. Started bleeding from buttock; 1 pint blood given in 30 min. During operation of débridement at which much bleeding 2 further pints blood administered, each in 15 min. Anæsthetic G.O.E. After operation P. 110, B.P. 112/70. After 24 hours general condition good; P. 120, B.P. 115/80, Hb 78%.

CASE 4.—Male, aged 20. Seen 4 hours after injury. Multiple wounds and compound fracture of both legs. Mentally clear, not in great pain, thirst ++, pallor ++, cyanosis of nails, no sweating, complained of cold. Pulse impalpable, B.P. 60/30. Morphia administered.

After 2 pints blood each taking 10 min. P. 120, B.P. 115/65. Great improvement in general condition, cyanosis disappeared; treated by warming and 1 pint blood by drip until turn came for theatre. During operation received 1 more pint blood and left theatre with P. 118, B.P. 90/50.

CASE 5.—Male. Seen 2 hours after injury. Severe scalp wounds, one ear off, extensive laceration left arm and probably intrathoracic injury. Mentally clear, colour ashen grey, complained of painful breathing; P. 155, B.P. 70. Warmed and morphia gr. ¼ administered.

After 4 bottles plasma in an hour P. 120, B.P. 120/70.

CASE 6.—Male, aged 23. Seen 4½ hours after injury. Simple fracture left femur, compound fracture right femur, fracture left clavicle, left Colles's fracture, abrasions head. Morphia gr. ½ given. Mentally clear, pain ++, thirst ++, colour normal, sweating nil, not cold. B.P. 75/60, P. 120.

After 1 pint plasma in 8 min. P. 104, B.P. 105/80. After 2nd pint plasma in 10 min. P. 92, B.P. 120/90. Anæsthetic begun. Had 3rd pint plasma by drip occupying 45 min. At end of operation P. 132, B.P. 145/50. Patient collapsed and died shortly afterwards. Was found to have multiple injuries, including fractured base, blood in c.s.f., fracture ribs, small tears in liver and spleen, hæmorrhage into right suprarenal.

CASE 7.—Male, aged 30. Seen 2½ hours after injury. Very large wound in back, involving right kidney. Had received morphia gr. ¼ 2 hours after injury. Apathetic, pain ++, thirst ++, pallor +++, sweating slight, cyanosis slight, cold, shivering. Pulse uncountable, B.P. 95/60, Hb vein 120%, hæmatocrit 43%.

After 1 pint plasma in 5 min. P. 150, B.P. 100/65. After 2nd pint plasma in 10 min. P. 120, B.P. 105/70, Hb vein 94%, hæmatocrit 33%. After 3rd pint plasma in 30 min. P. 140, B.P. 110/80, Hb vein 74%, hæmatocrit 26%. Sent for operation of débridement and ligature during which received 1 pint blood; 2 more pints blood given next day. After 48 hours condition fairly good; P. 120, B.P. 110/80, but passing much blood in urine. Died 3 days later.

CASE 8.—Male, aged 29. Seen 2 hours after injury. Shrapnel wounds both legs, compound comminuted fractures right and left tibia and fibula, machine-gun bullet wound in left loin, not penetrating abdomen. Tourniquets applied to both thighs; given morphia gr. ¼ an hour after injury and again an hour later. Put to bed with foot raised and warmed. Mentally clear, pain +, thirst +, pallor +, cyanosis of nails, sweating ++, cold, pulse impalpable, B.P. 60/40.

One hour later, after 1 pint plasma in 10 min. pulse flickering, B.P. 70/?. After 2nd pint plasma in 15 min. P. 120, B.P. 90/55. After 3rd pint plasma in 50 min. P. 110, B.P. 115/75. Taken to operating-theatre and on table for 2 hours, during which fourth pint of plasma administered by drip. Condition rapidly deteriorated when injured limbs were manipulated. Died few hours afterwards.

CASE 9.—Male, aged 16. Seen 1½ hours after injury. Compound fracture right thigh, much laceration and pulping of bone, and compound fracture lowest third left leg, much laceration and pulping of bone; gross swelling of both limbs above site of injury. Morphia gr. ¼ 45 min. after injury. Mentally clear, pain ++ when moved, thirst ++, pallor ++, cyanosis of lips +, sweating slight, cold. P. 112, B.P. 80/55, Hb finger 90%, ear 95%.

After 1 pint plasma in 12 min. P. 108, B.P. 95/70. After 2nd pint plasma in 20 min. P. 108, B.P. 95/70. After 3rd pint plasma in 45 min. P. 108, B.P. 110/75. Taken to operating-theatre for double amputation, during which 1 pint blood given in 28 min. and 1 pint plasma as drip. Left theatre with P. 104, B.P. 120/70. Uninterrupted recovery.

CASE 10.—Male, aged 26. Seen 2½ hours after being hit on back by lump of rock; very large bruise left kidney region, with great swelling left flank, and ? left pneumothorax. Given morphia gr. ¼ an hour after injury. Mentally clear, pain in chest +, thirst +, no pallor, cyanosis +, sweating slight, temperature normal, P. 130, B.P. 70/55, Hb vein 97%, hæmatocrit 37%.

After 1 pint plasma in 15 min. P. 108, B.P. 100/50, Hb vein 84%, hæmatocrit 33·5%. After 1 pint blood in 3 hours B.P. 125.

After 24 hours condition satisfactory.

CASE 11.—Male, aged 28. Seen 2½ hours after injury; compound fracture right femur, tibia and fibula, and fracture dislocation right carpus and metacarpus. No tourniquet. Morphia gr. ¼ given. Mentally clear, no pain, thirst +, pallor +, no cyanosis, sweating +, temperature normal, P. ?, B.P. 70/50.

After 1 pint blood B.P. 90/50. While 4 pints plasma were given in 1 hour 20 min. there was progressive improvement, resulting in B.P. 115 though bleeding continued. Excision of wounds and reduction of fractures begun. Left theatre with B.P. 140.

CASE 12.—Female, aged 50. Seen 3 hours after injury; deep wound right leg, smashed right and left feet (hanging by threads) with tourniquets still applied. Morphia gr. ¼ had been given 30 min. after injury and repeated 2½ hours later. Mentally clear, no pain, thirst +, pallor +, cyanosis +, no sweating, temperature normal, B.P. 95/65, P. 58, Hb finger 93%.

After 1 pint plasma in 20 min. P. 80, B.P. 110/80. After 2nd pint plasma in 40 min. P. 76, B.P. 118/85, Hb finger 74%. During this 40 min. consumed 2 cups sweet tea; colour greatly improved. Taken to operating-theatre for amputation and débridement.

After 24 hours condition good; P. 80, B.P. 115/80. Six weeks later B.P. when lying in bed 160/120.

CASE 13.—Male, aged 30. Seen 2 hours after injury; simple comminuted fractures of left femur, left tibia and fibula, and at lower ends of right tibia and fibula. Morphia gr. ¼ given an hour after injury and warmed up, but condition deteriorated. Tourniquet not applied until 1½ hours after injury. Delirious, pain ++, pallor +++, cyanosis +, sweating +, cold, P. 140, B.P. 60/30.

After 1 pint plasma in 20 min. P. 110, B.P. 80/50. After 2nd pint plasma in 20 min. P. 100, B.P. 100/60. Condition improved, pallor less. Mentally normal. After 1 pint blood in 50 min. P. 130, B.P. 110/70. Taken to operating-theatre for amputations; anæsthetic G.O.E., during operation given 1 pint blood in 60 min. Left theatre with P. 120, B.P. 110/70. After 48 hours condition satisfactory; P. 92, B.P. 150/90.

CASE 14.—Female, aged 48. Seen 5½ hours after injury; wound of right lower axillary region superficial to base of pleural cavity and right lobe of liver. Given morphia gr. ¼ an hour after injury and warmed for 3 hours before transfusion. Mentally rational, no pain or thirst, pallor +, cyanosis +, sweating +, cold, pulse impalpable, B.P. unrecordable.

After 2 pints plasma and 1 pint blood in 40 min. colour improved but still pulseless. After 1 pint plasma in 56 min. pulse flickering, B.P. unrecordable but hands becoming pink. After 1 pint plasma in 45 min. pulse and B.P. improved progressively: P. 144, 132, 132; B.P. 80/40, 120/60, 120/60. At this stage was fit for surgical exploration, but this was not performed. Patient died during next 24 hours from hæmorrhage, autopsy showed bomb fragment buried in lacerated liver.

CASE 15.—Male, aged 56. Seen 4½ hours after injury; fractured transverse processes of the lumbar vertebræ, 5 fractured ribs, fractured right clavicle and rigidity of abdomen suggesting hæmoperitoneum. Given morphia gr. ¼ and warmed for 3 hours after injury. Mentally confused, pain ++, no thirst, pallor +, no cyanosis, sweating +, warm, P. 104, B.P. 50/35, Hb finger 110%, ear 110%, vein 108%, hæmatocrit 46%.

After 1 pint plasma in 17 min. P. 92, B.P. 70/50. After 2nd pint plasma in 8 min. P. 100, B.P. 85/55, Hb finger 85%, vein 82%, hæmatocrit 36%. After 3rd pint plasma in 16 min. P. 104, B.P. 105/65, Hb finger 80%, vein 75%, hæmatocrit 33%. Much improved, colour better, B.P. at two-hourly intervals through night fluctuated from 95 to 110.

After 24 hours condition good; P. 96, B.P. 105/65.

CASE 16.—Male, aged 64. Seen 2 hours after injury; compound fracture left femur, simple fracture left humerus, 2 fractured ribs, and the following subsequently discovered at autopsy: retroperitoneal hæmorrhage, small cerebral hæmorrhage, left and right hæmothorax, small wound in spleen. Mentally normal, pain moderate, thirst slight, pallor +, cyanosis slight, sweating +, cold, P. 92, B.P. 50/?, Hb finger 94%, ear 96%, vein 106%, hæmatocrit 44%.

After 1 pint plasma in 10 min. P. 96, B.P. 56/?. After 2nd pint plasma in 10 min. P. 112, B.P. 72/50. After 3rd pint plasma in 15 min. P. 112, B.P. 84/50. After 4th pint plasma in 15 min. P. 92, B.P. 100/65, Hb finger 80%, ear 84%, vein 72%, hæmatocrit 31%. After 5th pint plasma in 40 min. P. 100, B.P. 95/60, Hb finger 62%, vein 64%, hæmatocrit 26%. Taken to operating-theatre for débridement thigh and extension, colour good. Left operating-theatre with P. 112, B.P. 100/50, having had 6th pint plasma in 65 min. Died 2½ days later.

CASE 17.—Male, aged 22. Seen 5 hours after bomb wound causing mangling of left foot; tourniquet applied. Pallor ++, sweating +, P. 110, B.P. 85/70.

After 1 pint blood in 15 min. P. 96, B.P. 100/65. Taken to operating-theatre with further pint of blood being administered by drip. Uneventful recovery.

CASE 18.—Male, aged 18. Seen 3½ hours after injury; compound fractures right humerus, right leg, severe lacerations left leg, multiple wounds especially round right shoulder. Morphia gr. ¼ given 1½ hours after injury and warmed with blankets. Drowsy, pain slight, thirst ++, pallor +, cyanosis +, no sweating, cold, pulse impalpable, B.P. 50/35, Hb ear 92%, vein 89%.

After 1 pint plasma in 10 min. P. 108, B.P. 80/45. After 2nd pint plasma in 40 min. P. 110, B.P. 95/60. After 3rd pint plasma in 30 min. P. 130, B.P. 115/70, Hb vein 55%. Taken to operating-theatre with 1 pint blood by drip; extensive débridement lasting 1½ hours accompanied by much bleeding. Died 6 hours after admission.

CASE 19.—Female, aged 19. Seen 3 hours after injury; severe crush of both legs almost severing legs below knees, 3 puncture wounds of abdomen subsequently found to have penetrated cæcum, 1 puncture wound left thorax. Morphia gr. ¼ given and tourniquets applied to both thighs 30 min. after injury. Morphia gr. ¼ given 2 hours after injury. Mentally clear, pain severe, thirst ++, pallor +, cyanosis +, sweating +, very cold, pulse impalpable, B.P. unrecordable.

After 1 pint plasma in 10 min. P. impalpable, B.P. 40/unrecordable. After 3 more pints plasma in 60 min. P. 144. After 1 pint blood in 45 min. P. 140, B.P. 98/unrecordable. Delay in transfer to theatre and in operation; condition deteriorated although drip of blood running; blood administered in theatre but died 8 hours later.

CASE 20.—Female, aged 38. Seen 8 hours after injury; multiple abrasions and large lacerated wound of face tearing both lips and whole of right side of cheek. Morphia gr. ¼ given 6 hours after injury. Mentally clear, pain ++, thirst ++, pallor +, cyanosis slight, no sweating, extremities cold, pulse uncountable, B.P. 90/60. No improvement with conservative measures.

After 1 pint plasma in 20 min. P. 124, B.P. 120/60. Another pint blood administered during operation for cleaning face, débridement and suture of left side of mouth. General condition 2 days later excellent.

CASE 21.—Male, aged 28. Seen 1½ hours after injury; blast effects to lungs, ruptured small intestine, extraperitoneal rupture of bladder, fractured pelvis, torn mesenteric vessels. Morphia gr. ¼ given 1 hour after injury. Just conscious, pain ++, thirst ++, pallor ++, cyanosis ++, sweating moderate, stone cold, pulse impalpable, B.P. 50/?

After 1 pint blood in 7 min. P. 140, B.P. 60/? After 2nd pint blood in 15 min. P. 110, B.P. 80/?. After 2 pints plasma in 52 min. P. 88, B.P. 110/70. During operation 2 pints blood administered slowly. Survived 24 hours.

CASE 22.—Female, aged 20. Seen 1¾ hours after injury; compound fracture left femur, extreme laceration left leg, wound right knee and left elbow, multiple small wounds and fractured pelvis due to splinter discovered at operation. Morphia gr. ¼ given ½ hour after injury. Mentally clear, pain +, thirst ++, pallor +, cyanosis slight, sweating ++, very cold, P. 70, B.P. 55/?.

After 1 pint plasma in 25 min. B.P. 80/?. After 2nd pint plasma in 50 min. P. 110, B.P. 50/?. After 3rd pint plasma in 20 min. P. 110, B.P. 70/40. After 4th pint plasma in 35 min. B.P. 85/40. After 1 pint blood in 60 min. P. 133, B.P. 100/60. Taken to operating-theatre where 2½ pints blood given. Died during operation.

CASE 23.—Male, aged 52. Seen 3 hours after injury; fractured right femur, scalp wounds, severe bruising of back. Morphia gr. ¼ given ½ hour after injury. Mentally slow, pain, thirst and pallor slight, cyanosis +, sweating +, very cold. P. 86, B.P. 60/40.

After 2 pints plasma in 20 min. P. 88, B.P. 145/80. Operation, pin through tibia; 72 hours later B.P. 160/76.

CASE 24.—Male, aged 25. Seen 3 hours after injury; compound fracture right tibia and fibula, puncture wounds both lower limbs, 3 puncture wounds shoulder, puncture wound right chest. Morphia gr. ¼ given ½ hour after injury.

Mentally clear, pain +, thirst ++, cyanosis slight, no sweating, cold, P. 144, B.P. 70/50.

After 1 pint plasma in 10 min. P. 140, B.P. 85/65. After 2nd pint plasma in 20 min. B.P. 100/70. After 1 pint blood in 30 min. P. 100, B.P. 105/80. A further pint blood administered as slow drip during operation. Died 5 hours later, probably from bilateral hæmothorax.

PRIMARY AND SECONDARY SHOCK

Primary shock due to psychogenic and neurogenic influences is common among air-raid casualties which reach hospital soon after their injury. Most are at least frightened and shaken. These, from primary shock alone, may exhibit pallor, sweating, feeble pulse and low blood-pressure or even be unconscious. Differentiation of primary from secondary shock is easy with extremes of injury, when the wounding is of such severity that immediate transfusion is obviously required and delay would be dangerous, or when there are no wounds and transfusion would be both unnecessary and foolish. But in intermediate cases differentiation is only possible by allowing a period of observation; the degree to which rest in the recumbent head-low position combined with warmth and morphia produces improvement will depend on how far the symptoms are due to primary shock. If at the end of an hour the blood-pressure is still below 100 mm. Hg some degree of secondary shock is probable and transfusion should be done before an anæsthetic is given. But if within the hour the blood-pressure rises and stays above 100 mm. Hg it may be assumed, even though a normal figure has not been completely reached, that the shock was mainly primary and that transfusion is not necessary for resuscitation, though it may well be required during operation. The blood-pressure should be taken every 15 min. so that patients who are losing way may be transfused without delay. In order to carry out this work satisfactorily a special resuscitation ward must be established between the reception point and the operating-theatre. All the 24 cases here described had either wounds so severe as to brook no delay in instituting transfusion or a blood-pressure which failed to recover to 100 mm. Hg with rest, warmth and morphia.

ASSESSMENT OF SEVERITY

In general we have found that the blood-pressure is the most reliable measurable factor for assessing the severity of secondary shock and that other clinical manifestations are variable and not quantitative.

The *pulse-rate* has not always been as rapid as it is generally assumed to be in severe secondary shock nor does it regularly rise in proportion as the blood-pressure falls. Thus 5 cases (2, 3, 15, 16, 22) had rates of 86, 82, 104, 92, 70 with systolic blood-pressures of 55 mm. Hg or less, and one (12), who proved in a follow-up to be a hypertensive, had a pulse-rate of 58 with a systolic pressure of 95 mm. In the remainder the pulse-rate ranged from 110 to 155 and did not appear to bear any constant relation to the blood-pressure. The response of the pulse-rate to transfusion was even more irregular, in strong contrast to the response of the blood-pressure.

The *mental state* in 17 cases was clear and rational. This point which is of great practical importance—that the mental state is no index of the severity of shock—was repeatedly stressed by observers in the war 1914–18, who found that in the absence of head injury a clear normal mind was usual in secondary shock even within a few minutes of death.

As to *pain*, all of our 24 patients had had morphia; pain is recorded as absent in 4, slight or moderate in 8 and severe in 11, and was not recorded in 1.

Colour-changes are common but in no way quantitative; 22 out of 24 patients showed obvious pallor and most had also cyanosis of the lips and nails. Extreme pallor in association with a relatively high blood-pressure suggests intense compensatory vasoconstriction.

The general *temperature* of all severe cases is invariably subnormal and the extremities feel cold. This feature, however, depends greatly on the atmospheric conditions, the exposure during transit and the efficiency of the methods for warming. *Sweating* was present in 15 cases but the amount was by no means related to the degree of shock.

The records of *blood-pressure* are shown in table I. With two exceptions (7, 12) the most severely wounded had the lowest blood-pressures. The two exceptions are instructive. Case 12 was found in a follow-up to be a hypertensive having a blood-pressure of 160/120 when lying in bed; her initial blood-pressure of 95 mm. was therefore a relatively large fall from normal. Case 7, though severely wounded and exsanguinated, nevertheless appeared to be capable of maintaining his blood-pressure at 95 mm. Hg by intense vasoconstriction. Our experience of over 100 cases shows that this feature is a real entity especially in young subjects seen soon after wounding. The phenomenon is suggested by an intense pallor in association with an unexpectedly high blood-pressure. In the particular case here recorded this view is supported by the response to transfusion, in that 3 pints caused a rise of only 15 mm. in blood-pressure though it much improved the man's general condition. Apart from these two cases there has been a remarkable correlation between the reduction in blood-volume and the fall in blood-pressure while restoration of blood-volume by transfusion has been found to be associated with a proportional recovery in blood-pressure (tables I and II).

TREATMENT AND ASSESSMENT OF RECOVERY

It is generally accepted that the symptoms of secondary shock are caused largely by gross reduction in blood-volume which leads to an inefficient circulation, later to irreversible tissue-cell changes owing to malnutrition, and finally to circulatory failure. The obvious treatment is to restore blood-volume. Information is required as to the best fluid for this purpose, when to transfuse, in what amount and at what rate. From the physiological aspect whole blood is needed by those whose reduction in blood-volume is due mainly to whole-blood loss, and this is usually the case with those who are neither burned nor crushed and who are seen soon after wounding before complex hæmatological changes have occurred. We have analysed our cases in relation to fluid, time, amount and rate but have used more plasma than blood with a view to obtaining information as to its efficiency as a volume-restoring fluid.

It has already been indicated that transfusion without delay should be carried out on those with serious wounds and a dangerously low blood-pressure, on those whose blood-pressure does not recover to 100 mm. Hg within an hour of routine resuscitation and on those whose blood-pressure, observed at 15-min. intervals, continues to decline during the resuscitation hour. Blood-pressure readings have been taken during the course of transfusion after every 540 c.cm. of blood or plasma transfused. Table I sets out the observed results and a detailed analysis shows that a rise of 10–20 mm. Hg is obtained after each 540 c.cm. transfused, the average figure for the series for each successive bottle up to five being 19·1, 11·6, 16·4, 18·3 and 16·7 mm. This table in conjunction with table II suggests that in order to obtain a systolic blood-pressure of 100 mm. Hg or over it was necessary to transfuse not less than 50% of the calculated blood-loss, which may amount to 1000–3500 c.cm. in severe cases of secondary shock. Coincident with this improvement in blood-pressure there was a striking amelioration of other symptoms. The behaviour of the pulse emphasised the unreliability of this factor for assessing improvement. In a series of observations of pulse-rate before and after each 540 c.cm. bottle it was found that after twenty-one bottles the rate fell, after twenty it rose and after four it remained unchanged. Transfusion seemed to produce a fall of rate in those in whom it was initially rapid and vice versa. The general response to transfusion, and particularly in the blood-pressure, which appears to rise quantitatively with the amount transfused, has been a constant feature of our cases.

The value of blood-pressure determination has been emphasised by observations on cases in whom there has been no external evidence of severe loss of blood but detailed investigation has shown that such loss has taken place. Case 16 illustrates this point. The external injuries in this man of 64 were a simple fracture of one arm, two fractured ribs and a compound fracture of the femur with a small wound. Five 540 c.cm. bottles were required during the resuscitation period and one more during operation to raise the blood-pressure to 100/55. This patient died 2½ days later from postoperative bronchopneumonia. At autopsy it was found that the estimated loss to the circulation could be accounted for

TABLE I—RELATION BETWEEN RECOVERY OF BLOOD-PRESSURE AND VOLUME TRANSFUSED

Case No.	Age	Initial pulse-rate	Initial B.P.	B.P. after pints					Time taken (min.)
				1	2	3	4	5	
1	60	Un	Un	40/Un	60/40	80/50	105/55	..	65
2	26	86	50/30	70/60*	80/75*	95/75*	..	..	60
3	24	82	40/30	70/40	80/45	100/55	Bl.	..	60
4	20	Un	60/30	N.R.*	115/65*	..	..	..	20
5	?	155	70/Un	N.R.	N.R.	N.R.	120/70	..	60
6	23	120	75/60	105/80	120/90	..	..	..	18
7	30	Un	95/60	100/65	105/70	110/80	..	..	45
8	29	Un	60/40	70/Un	90/55	115/75	..	..	75
9	16	112	80/55	95/70	95/70	110/75	..	..	77
10	26	130	70/55	100/50	125/N.R.*	..	..	..	195
11	28	Un	70/50	90/50*	Bl.	..	..	..	..
12	50	58	95/65	110/80	120/85	..	..	..	60
13	30	140	60/30	80/50	100/60	..	..	..	40
14	48	Un	Un	N.R.	N.R.*	N.R.	80/40	120/60	140
15	56	104	50/35	70/50	85/55	105/65	..	..	41
16	64	92	50/Un	55/Un	70/50	85/50	100/65 P.Bl.	95/60	90
17	22	110	85/70	100/65*	..	..	..	..	15
18	18	Un	50/35	80/45	95/60	115/70	..	..	80
19	19	Un	Un	40/Un	N.R.	N.R.	N.R.	98/?*	115
20	38	Un	90/60	120/60	..	..	..	..	20
21	28	Un	50/?	60/?*	80/?*	N.R.	110/70	..	74
22	20	70	55/?	80/?	50/?	70/40	85/40	100/60*	190
23	52	86	60/40	N.R.	145/80	..	..	..	20
24	25	144	70/50	85/65	100/70	105/80*	..	..	60

Un = Unrecordable. N.R. = Not recorded.
Bl. = Bleeding. P.Bl. = Probably bleeding.

All transfusions were of citrated plasma except those marked * where citrated blood was given.

as follows: swelling of arm and thigh 1200–1500 c.cm., hæmothorax 200 c.cm., hæmoperitoneum 250 c.cm., retroperitoneal hæmorrhage 800 c.cm., external loss at time of injury ?, total 2600 c.cm.+. In all cases seen by us it has appeared that the loss of blood-volume can be accounted for by external loss and by extravasation into the injured area. In no case has there been any evidence to suggest loss of plasma in regions remote from a seat of injury.

The volumes transfused (tables I and II) concern the amount necessary to relieve secondary shock prior to operation. It must be remembered that delay in operation after resuscitation may be associated with deterioration in general condition first from continued blood-loss and secondly from excretion of the citrate portion of the transfused plasma or blood. Resuscitated patients should be regularly observed, and if necessary transfusion should be continued during the period of delay. Furthermore, most cases suffer hæmorrhage at operation. No less than 15 of our 24 cases required transfusion during the operation itself.

In general we have concluded that the amount to be transfused should be governed by the blood-pressure response, on which a watch should be kept during any delay as well as during operation. As to rate we have formed the opinion that the first two 540 c.cm. bottles should be administered rapidly, each bottle occupying about 15 min. Further amounts, except when the blood-pressure is dangerously low (75 mm. or less), should be given at a slower rate and be governed by clinical judgment. Transfusion with a blood-pressure in the region of 100 mm. Hg should be continued as a drip, allowing a rate of one bottle in 3–4 hours. This last procedure is a good safety measure to tide over any delay in operation, while the transfusion, administered by cannula, can accompany the patient to the theatre and then be speeded up if there is any sudden hæmorrhage or rapid deterioration in general condition.

HÆMATOLOGICAL ASPECT

Of our 24 cases, 9 have been investigated hæmatologically, some more completely than others; 8 have been sufficiently examined for the serial hæmoglobin or hæmatocrit determinations to permit of calculation of the blood-volume at the beginning of treatment by the method described by Bushby, Kekwick and Whitby (1940). When the blood-volume is known a shrewd estimate of the blood-loss can be made by assuming an approximate normal blood-volume of 5½ litres for a man and 5 litres for a woman. Table II shows that it is possible to sustain an acute loss of as much as 3½ litres of blood and yet survive provided that reasonable restoration of blood-volume is carried out quickly and adequately. There can be little doubt that if these cases had suffered the delay in treatment which is almost inevitable with battle casualties most of them would never have reached a dressing station alive. The series provides examples of both the accuracy and the fallacy of the method for estimating blood-volume. As to accuracy, case 15 was examined by consecutive hæmatocrit measurements of venous blood and estimations of the hæmoglobin content of capillary blood; the blood-volumes calculated from these different angles were close—3·9, 4·0, 3·8, 4·1 litres respectively. Fallacy is well shown by case 16 where an autopsy two days later made it clear that he was actively bleeding at the time of investigation. Continuance of bleeding renders the calculation inaccurate, biasing the result towards underestimate of blood-loss in direct proportion to the amount of bleeding. From the clinical aspect there can be no doubt that continuance of bleeding is the commonest cause of failure to affect a rise in blood-pressure despite adequate transfusion. Table II sets out the calculated blood-loss, the total and protein fluid restored to the circulation, and the effect of this on the blood-pressure. The results show that when the calculated blood-loss is restored to the extent of 50% or more the effect on the blood-pressure is usually satisfactory. These hæmatological results therefore confirm the accepted clinical belief that transfusion should continue until blood-pressure has been satisfactorily restored. But they also provide a valuable check on clinical impression. For example, case 16 shows that when the calculated blood-loss is disproportionately small in relation to the amount of fluid necessary to restore blood-pressure, continuous unrevealed bleeding should be suspected. There are also other, perhaps uncommon, causes of a sustained low blood-pressure in a wounded man besides reduced blood-volume. The simple hæmatological check combined with good clinical judgment can prevent such cases from having a gross excess of fluid transfused in an effort to restore blood-pressure, so avoiding the danger of pulmonary œdema.

Table II analyses the fluid administered in terms of its protein content—that is, of that portion of the fluid which will remain in the circulation, in contrast to the crystalloid portions which are invariably excreted fairly quickly. The results show the effect on blood-pressure up to the end of the resuscitation period. The importance of maintaining the good effect during the operation period has already been stressed. For this permanent result only the protein fraction can be considered effective.

TABLE II—HÆMATOLOGICAL FINDINGS AND RELATION OF CALCULATED BLOOD-LOSS AND INTRAVENOUS FLUID REPLACEMENT TO BLOOD-PRESSURE BEFORE AND AFTER RESUSCITATIVE (BUT NOT OPERATIVE) TREATMENT

Case No.	Hb vein	Hb finger	Hb ear	Time after wounding (hrs.)	Calculated blood-loss (c.cm.)	Fluid administered (c.cm.)	Protein fraction of this	B.P. before	B.P. after	Percentage of lost fluid replaced
1	104	100	..	2½	3500	2160	1540	Un/Un	105/55	62
3	..	..	120	5½	2250	1620	1155	40/30	100/55	72
7	120	..	..	2½	2000	1620	1155	95/60	110/80	80
9	..	90	95	1½	..	..	..	..	..	..
10	97	..	..	2½	1100	1120	825	70/35	125/ N.R.	100
12	..	95	..	3	1200	1080	770	95/65	120/85	90
15	108	110	110	4½	1600	1620	1155	50/35	105/65	100
16	106	94	96	2	500*	2700	1925	50/Un	95/60	1540
18	98	..	92	3½	3000	1620	1155	50/35	115/70	54

* Probably bleeding. Un = Unrecordable. N.R. = Not recorded.

Hence it is essential that the transfused protein fraction should be not less than 50% of the fluid lost and preferably more, bearing in mind that with Army Blood-transfusion Service plasma of every 7 pints transfused 2 are lost as crystalloids. The experimental results of Magladery, Solandt and Best (1940) showed that a protein replacement of at least 40% was required when treating hæmorrhagic shock with serum.

The results shown in table II provide some suggestive facts concerning the phenomenon of hæmoconcentration. There is in the first place no glaring evidence that this is at all marked in cases not suffering from burns or crush injuries who are seen within 4½ hours of wounding, in that in 7 out of 9 cases neither the capillary nor venous hæmoglobin before beginning treatment has been above 110% (range 94–110%) though in 2 cases the hæmoglobin has reached 120%. Likewise there is no obvious evidence of hæmodilution, or, in 4 cases, of any gross discrepancy between venous and capillary hæmoglobin values. This is not to say that hæmoconcentration may not be found in more advanced cases, in whom there is a longer period between wounding and observation, but it seems that the cardinal symptoms of shock can be present without much hæmoconcentration. The point can only be decided with certainty by serial observations of hæmoglobin or hæmatocrit or both before treatment is begun.

MISCELLANEOUS OBSERVATIONS

Plasma.—The citrate plasma transfused (165 pints) to the cases recorded here as well as in our whole series has been from 10 to 56 days old. The maximum given to any one case has been six 540 c.cm. bottles. There have been rigors in 3 cases but we have noted that almost all seriously battered and frightened casualties show some degree of shivering even before resuscitation has begun. Investigation of these cases has shown no evidence that the rigors were due to old plasma, opalescent plasma, plasma with clots or refiltered plasma.

Blood or plasma.—Both fluids appear to be equally efficient for restoring blood-volume, in agreement with the experimental results of Buttle, Kekwick and Schweitzer (1940). Of the 24 cases, 14 were treated with plasma alone, 4 with blood alone and 6 with plasma and blood during the resuscitation period. More plasma than blood was used mainly for the purpose of collecting data, but we have formed the opinion that when the amount of transfused fluid needed reaches three 540 c.cm. bottles or more at least one bottle in three should be blood.

Alkalosis.—It is well known that shocked patients may show a varying degree of acidosis. It is sometimes asked whether the amount of sodium citrate given in a large transfusion may not cause alkalosis. The CO_2-combining power of the blood was determined in case 16 only; this patient received in 3 hours six bottles of plasma containing approximately 28 grammes of sodium citrate. The first determination was made after 18–19 g. had been given and was 35 volumes %. After 28 g. the CO_2-combining power was 53 volumes %, and early the following day 62 volumes %. In this case a large amount of citrate given relatively quickly did little more than aid in the correction of an acidosis, which was probably much severer than the first of our readings indicates, and it seems unlikely that sufficient citrate to be dangerous could be given in the form of stored blood or plasma.

DISCUSSION

In our experience the wounds in air-raid casualties have been multiple and severe. So much so that had it not been for the promptitude with which they have been treated most of the patients recorded here would have died. Only the less severe cases would drift slowly into the condition of shock which is found in battle casualties. Hence these preliminary results do not necessarily contradict observations made during the war 1914–18. With these severe injuries the onset of symptoms of shock appears to be rapid and the cardinal sign of the condition, a sustained and progressive lowering of the blood-pressure, is well established within a few hours. Lowered blood-pressure as well as some of the other features of secondary shock (sweating, thirst, pallor) are also found in primary shock. It therefore seems wise to differentiate primary from secondary by allowing a period of observation, during which rest in the recumbent head-low position is combined with warmth and morphia, before resorting to transfusions, unless the nature of the wounds makes it obvious that the patient must have suffered the reduction in blood-volume which is the cause of the cardinal sign of secondary shock. This small series emphasises that, in the earlier phases, a blood-pressure reading is the only reliable measurable observation and that pulse-rate does not always rise as blood-pressure falls. Pulse-rate may be dangerously misleading.

Our results justify the conclusion that reduction in blood-volume demands a reasonably quantitative replacement of protein fluid if a permanent improvement in condition is to be obtained and maintained through a perhaps severe operation. In some cases the amount of fluid required is almost unbelievably large but with each successive pint transfused there should be an appreciable rise in blood-pressure of 10–20 mm. Hg. If this does not occur continued bleeding should be suspected. Nevertheless, over-enthusiasm for quantitative replacement has its dangers. An overfilled circulation is almost as great a menace as one which is dangerously emptied. When hæmatological tests can be performed these supply a valuable check on the blood-pressure readings which should, whenever possible, never be omitted. In the absence of blood-pressure readings attention should be paid to the volume of the pulse rather than to the rate. Our impression is that 2 pints can be administered quickly without risk to a case of secondary shock with a blood-pressure below 100 mm. Hg. If this produces the anticipated rise in blood-pressure more can be administered with safety, though if the clinical condition has equally improved the rate of administration can be judiciously slowed. But if there is no improvement in blood-pressure with 2 pints quickly administered, and continued bleeding is neither obvious nor likely, a short time should be allowed for warmth and fluid by mouth to bring about that later improvement in blood-pressure which a number of cases appear capable of effecting. This is a better practice than continuing with a large rapid transfusion which carries with it a danger of pulmonary œdema if the circulation is overfilled. The rate of administration after the first 2 pints requires sound clinical judgment. But whenever there is clear evidence of gross loss of blood an approximately quantitative replacement should be aimed at.

SUMMARY

In observing 24 cases of secondary shock a sustained and serious fall in blood-pressure, in spite of simple resuscitation procedures, has been found to be the one reliable clinically measurable criterion of the severity of the condition. The pulse-rate is unreliable.

Simple hæmatological investigations combined with plasma transfusion provide a helpful check on deductions made from blood-pressure readings with regard to the amount of fluid that needs to be transfused.

As a rough rule a rise of 10–20 mm. Hg can be anticipated from every 540 c.cm. transfused, provided that bleeding has ceased and that no other causes of loss of circulatory fluid are operating.

Plasma and blood are equally effective for restoring blood-volume. With large transfusions 1 pint in 3 may, with advantage, be blood.

An approximately quantitative replacement of lost fluid is required. At least half of this should be protein fluid, otherwise the restoration of blood-pressure will be only temporary and an operation will not be well borne.

Transfusion should continue during any delay before operation as well as during operation, especially if more blood is likely to be lost at that time.

The observations reported here have been carried out by two teams consisting of a clinical observer, who recorded blood-pressure, pulse-rate and other clinical facts, a hæmatologist, a "transfuser" and one or two V.A.D. nurses. These have devoted their whole time to recording results unhampered by other work. Even with this generous allotment of personnel it has not been possible for any team to deal with more than 3 or 4 cases in a period of six hours. We are grateful for the assistance of Captains J. E. Vaughan-Jones, S. Glaser and H. Ellis, Lieutenants H. W. Bailie, J. Dean, W. Wynne-Willson, Ethel Whitby, Faith Poles and Joyce Morgan, Q.M.S. Bushby and Staff-Sergeant R. Blake, all of the R.A.M.C.; and for the facilities afforded by the staffs of the Bristol Royal Infirmary and Southmead Hospital.

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SULPHATHIAZOLE IN CEREBROSPINAL FEVER

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INTEREST in sulphathiazole (2-*p*-amino-benzene-sulphonamide-thiazole), M. & B. 760, Thiazamide or Ciba 3714, since January, 1940, has been chiefly focused on its action in staphylococcal and more recently in pneumococcal infections. Gsell (1940) reported favourably on the treatment of pneumococcal, gonococcal, coliform and meningococcal infections with this drug, and described 7 cases of cerebrospinal fever, all of which recovered. Since then, apart from a brief reference of my own to 15 cases (Banks 1940a), I have been able to trace only three articles on the use of sulphathiazole in cerebrospinal fever, all in Hungarian journals, and have been unable to obtain translations. In America there is a disposition to view with disfavour the employment of sulphathiazole in meningitis because it achieves only a low concentration in the cerebrospinal fluid. According to Rammelkamp (1940) "sulphathiazole diffuses irregularly into the cerebrospinal fluid and therefore has not been used in meningitis." Carey (1940) goes so far as to state that "it should not be used in meningitis, as its concentration in the spinal fluid reaches only from 10 to 30% of that in other body fluids." I hope to show, however, that this conclusion is contradicted, at least for meningococcal meningitis, by the success obtained in practice, although I admit that Carey's premises are substantially correct.

Sulphathiazole treatment was adopted at the Park Hospital in May, 1940, and used exclusively during the post-epidemic period, May 15–Dec. 27, 1940. The cases, on the whole, were intermediate in severity between those of the epidemic period (January–May, 1940) and those of the two previous seasons of sporadic incidence, 1937–38 and 1938–39, when other sulphonamide drugs were used. Of the 96 cases treated with sulphathiazole 17 were classified as mild, 50 as moderate, 26 as severe and 3 as very severe. Exactly a third (32 cases) had petechial or purpuric rashes. It was difficult to make an accurate clinical assessment of severity, owing to the exceedingly rapid improvement effected even in the most severe cases by sulphathiazole, especially by an intravenous injection. For the same reason the meningococcus could not be demonstrated in a considerable proportion of cases. Many of the patients had had one or more doses of sulphapyridine in the general hospital from which they were transferred. Thus, though all were typical clinical cases and had turbid or purulent cerebrospinal fluid the meningococcus was seen or grown in 66 only; typing in 25 cases showed 17 of group I, 5 group II and 3 inagglutinable. Of the whole series 7 had had sulphapyridine treatment before admission for thirty-six hours or more; 4 of these were judged to be recovering on admission and were accordingly excluded and classed with the sulphapyridine series. The remaining 3 cases had a dosage of sulphapyridine which is not unusually given but which I am now convinced is dangerously low—e.g., 6 g. daily for an adult, or 1 g. daily for an infant of 10 months. Of these cases 2 still had meningococci in the C.S.F. after two and a half days of treatment, a thing which never occurred after sulphathiazole in standard dosage, and the third case had flakes of exudate still coming away through the lumbar-puncture needle. All 3 rapidly recovered on sulphathiazole and were therefore allocated to the sulphathiazole series.

TABLE I—RESULTS OF CHEMOTHERAPY IN PREVIOUS SERIES

Age-group (years)	1937–38* (sporadic)		1938–39† (sporadic)		Jan.–May, 1940† (epidemic)	
	Cases	Deaths	Cases	Deaths	Cases	Deaths
Under 1 ..	10	1	10	1	13	6
1–5 ..	10	2	22	1	32	3
5–20 ..	23	2	24	1	39	1
20–40 ..	21	4	19	0	38	1
Over 40 ..	6	2	5	2	12	1
Total ..	70	11	80	5	134	12
Case-fatality rate ..	15·7%		6·25%		9%	

* Serum and sulphanilamide.
† Sulphanilamide or sulphapyridine, or both.

In 52 of the 96 cases one or more doses of sulphapyridine had been given before admission, and in 44 cases sulphathiazole was the only treatment. Serum had been given to 2 cases only before admission, and was without appreciable effect. Experience of this series has confirmed my opinion that there is no demonstrable advantage in combining serum with chemotherapy, provided that the drug is given in adequate dosage and intravenously if necessary. The effect of adequate chemotherapy is usually demonstrable within twelve hours, while the effect of serum takes two or three days to show itself.

TABLE II—SULPHATHIAZOLE SERIES, MAY–DECEMBER, 1940

Age-group (years)	Sulphathiazole		Total	Deaths
	Mainly	Wholly		
Under 1 ..	4	2	6	..
1–5 ..	7	13	20	..
5–20 ..	11	13	24	1
20–40 ..	20	9	29	..
40–50 ..	5	4	9	1
50–60 ..	3	3	6	..
Over 60 ..	2	..	2	..
—	52	44	96	2

Results of treatment in three series of cases treated in this hospital since chemotherapy was introduced are given in table I (see Banks 1938, 1939, 1940b). The age-grouping is somewhat similar in both tables except that, in the sulphathiazole series (table II) the proportion of infants is somewhat lower and of patients over forty somewhat higher. In 1937–38 treatment was by serum and sulphanilamide. In 1938–39 and in January–May, 1940, treatment was by sulphanilamide or sulphapyridine or both drugs combined. Results in the present series of cases (table II) treated with sulphathiazole alone, or with a few preliminary doses of sulphapyridine, compare favourably with those of all three previous series. The case-fatality rate of 2·1% in the sulphathiazole series is actually the lowest yet obtained in this hospital. In assessing these figures some regard should be had to the relative mildness of post-epidemic as compared with epidemic cases and also to the fact that our technique has improved as experience of chemotherapy has matured. Sulphathiazole has not yet been tested under epidemic conditions. Nevertheless, it has already given satisfactory results in some very severe cases, such as cases 4 and 5 below. The single case in which it failed was a fulminating one with early and absolute coma similar to those which so often proved fatal during the epidemic period, when sulphapyridine was the drug employed. Taking all things into consideration, I regard sulphathiazole as the most satisfactory drug which I have so far used in meningococcal meningitis.

DOSAGE AND TOXICITY

I followed the dosage scheme which I originally adopted for sulphanilamide and later for sulphapyridine in the treatment of meningococcal meningitis.

Age-group ..	Under 2	2–5	5–10	10–15	Over 15
Daily dose (g.) ..	3	4½	6	7½	9

This scheme was maintained for an initial period of two to three days according to severity; then two-thirds of the dose was given for two days and finally one-third for a further two days. The period of administration is six to seven days and the total amount of the drug given is 40–50 g. for an adult. The drug is given four-hourly during the initial period and thereafter four- or six-

hourly according to convenience. The first or "loading" dose is ½ g. higher than the average dose for a child (except an infant under six months) and ½ g. higher for an adult. In all severe cases, especially those in coma, those who cannot or will not swallow, and those who are vomiting, the drug should be given intravenously for one or two doses, and thereafter by mouth or stomach-tube. The 5% sodium solution may be given intramuscularly if intravenous injection is impracticable. Intrathecal injection should never be given; the solution is dangerously irritating. A dose of 20 c.cm. (1 g.) of the sodium solution given intravenously is usually sufficient for an adult; 40 c.cm. may be given in a very severe case. For a young child or infant 10 c.cm. (½ g.) suffices. The external jugular vein is a convenient site for injection in infants.

Such dosage of sulphathiazole has so far proved to be almost entirely non-toxic, and this is the great advantage of the drug over sulphapyridine. Nausea, vomiting and consequently dehydration were rare; only 7 cases vomited twice or more. A single intravenous injection of sodium sulphathiazole seemed to stop the vomiting strikingly in 2 children; in another case an enema had the desired effect. There was neither mental depression nor disorientation such as are common with sulphapyridine, and cyanosis was absent or slight. Drug rash, drug fever, erythema nodosum and hæmaturia (all of which are said to be fairly common with sulphathiazole) were not encountered in this series, possibly owing to the relatively short periods of treatment. Slight leucopenia occurred in 1 case, a boy aged three years who received 24 g. of sulphathiazole in seven days; his white cells numbered 4600, with 70% polymorphs on the seventh day of treatment; the drug was stopped immediately and the next day the white cells were 5500 and thereafter steadily increased. This relative non-toxicity of sulphathiazole justifies the high initial dosage of 3 g. daily for infants and 9 g. daily for adults. I believe that dosage of any of the three sulphonamide drugs should never be lower than this in meningitis.

Sulphapyridine is still often given in what might be called the "pneumonia dosage"—6 g. daily (after the two preliminary "loading doses") in adults, and about 1 g. daily in infants. I quote 2 examples which serve to indicate that these amounts are inadequate and therefore may be dangerous in meningitis.

CASE 1.—A woman of 54 was admitted to a general hospital semi-comatose, with petechial rash on body and limbs, neck rigidity, pharyngitis and bronchitis. The C.S.F. was purulent and contained meningococci. She was treated with 20 c.cm. Soluseptasine intravenously, followed by sulphapyridine 6 g. daily for two and a half days, when she was transferred to the Park Hospital. She was still semi-comatose, with neck rigidity and a petechial rash; the C.S.F. contained over 5000 cells per c.mm. and still showed meningococci in films, although they did not grow on culture. She was put on sulphathiazole 9 g. daily. In 48 hours the C.S.F. contained 355 cells per c.mm. (mononuclears 60%) and no organisms, and she was rational and comparatively well. During ten days she received 15 g. of sulphapyridine and 43 g. of sulphathiazole. Eleven days after the drug was stopped she relapsed; meningeal signs reappeared and the C.S.F. was again turbid, with over 1000 cells per c.mm. but no organisms demonstrated. She was put on a second course of sulphathiazole, beginning with 12 g. in the first twenty-four hours, followed by 9 g. in the next three days; the dosage was then gradually reduced. During the relapse she had 64 g. sulphathiazole in eight and a half days, at the end of which period blood-counts were normal. She made a complete and rapid recovery from the relapse.

This was the only relapse in the whole series and I consider it to be associated with the low dosage (6 g.) of sulphapyridine in the first two and a half days.

CASE 2.—A boy aged 10 months was admitted to a general hospital with the diagnosis of pneumonia. Sulphapyridine ½ g. was given thrice daily for two and a half days. Increasing neck rigidity, irritability and tense fontanelle; lumbar puncture then yielded a turbid C.S.F. still containing meningococci. He was transferred to the Park Hospital where 1 g. of sulphathiazole was given as a loading dose, followed by 3 g. daily for three days; the dose was then gradually reduced. Within three days all neck rigidity had disappeared and recovery was rapid. He was discharged after seventeen days.

I do not know why infants and young children require an amount of the drug two or three times as high in proportion to body-weight as that which is appropriate for adults. I do know, however, that they tolerate it and that any less amount may be dangerous. These were the only 2 cases in the series in which meningococci were demonstrated as long as two and a half days after chemotherapy began, and I think that the dosage of sulphapyridine was dangerously low.

COMPLICATIONS

Paresis of the right sixth cranial nerve developed in 5 cases, of the left in 1, of both sixth nerves in 1 and of the right seventh in 2. These pareses all cleared up in periods ranging from a few days to three months. The serious lesion of the eighth nerve which results in absolute deafness is noted under "sequelæ." Arthritis or bursitis occurred in 8 cases, involving variously the fingers, wrist, elbow, shoulder and knee-joints. The synovial fluid was often turbid but the joints cleared up in a few weeks or less. Glycosuria was present for two days after admission in one case, a woman of fifty, and there was no ketosis. Shallow sprawling vesicles and ulcers in the purpuric areas of the rash were noted in 3 cases, and were probably meningococcal in origin. No organisms were isolated from these ulcers or from joint exudates, probably owing to the effect of the drug. In one case there was a relapse of the meningitis.

There were only 2 deaths in the whole series. The first was a fulminating case in a man of forty-five who was found in absolute coma and died within twenty-one hours of admission. He had a total of 6½ g. of sulphathiazole. The other patient (case 3) died six hours after admission—before sulphathiazole could be effective.

CASE 3.—A soldier aged 19 was admitted on the second day of disease complaining of intense headache and pains in limbs. There was a profuse petechial rash on trunk and limbs, considerable neck rigidity and some head retraction. He was restless and irritable when disturbed, and drowsy, but not comatose. The C.S.F. was slightly turbid, under pressure and contained meningococci. He was difficult to manage at lumbar puncture and was therefore given morphine gr. ¼ and hyoscine gr. $\frac{1}{150}$ hypodermically. Four hours later he was still rather restless, the pulse was good, respirations not shallow, but the pupils were contracted; he was swallowing drinks quite well. Two hours later he was found by the nurse pulseless and moribund and with pupils widely dilated. He died five minutes later, six hours after admission. Treatment was by sulphathiazole 2 g. by mouth on admission and 1½ g. four hours later, a total of 3½ g. At autopsy there was moderate congestion of the meningeal vessels and some sero-fibrinous exudate about the optic chiasma and in the sulci.

This death was unexpected. He was a healthy young man and with only a moderately severe attack of meningitis which we had expected to cure rapidly by chemotherapy. An experience of two or three similar cases suggests that the morphine and hyoscine was an indirect cause of this death, although there was no actual evidence of morphine poisoning. In acute meningitis hypodermic morphine is best restricted to gr. ¼ at any one dose.

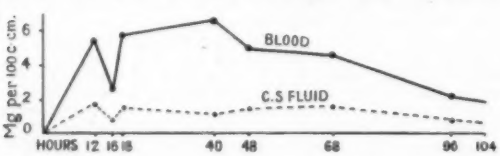
SEQUELÆ

The only sequela of practical importance was deafness. This is a nerve deafness, often absolute, permanent and bilateral, and it is now a serious public-health problem and calls for special measures of aftercare. In 2 cases the deafness was fortunately partial and cleared up in a few days. No less than 5 patients developed absolute or nearly absolute deafness; in 4 it was bilateral and 1 unilateral. The ages were 3, 4, 6, 32 and 54 years respectively. In at least 2 cases a vestibular lesion causing difficulty in balancing was present in addition, but this cleared up or was compensated almost completely after several weeks. The deafness in 2 cases was noted on the day before admission to hospital, and in the other 3 cases, all young children, it was probably present on admission. In only one case was any sulphonamide drug given, and then only g. ½, before signs of deafness appeared. Deafness in meningitis thus appears in the early acute stage, is not due to the drug and was apparently cured in only 2 cases out of 7. The apparent

increase in deafness following cerebrospinal fever in the last few years is probably a result of the high proportion of recoveries now being obtained by chemotherapy. A follow-up scheme should now be instituted to ensure for the affected children facilities for special education and training, and for the adults training in lip-reading.

CONCENTRATION OF SULPHATHIAZOLE IN BLOOD AND C.S.F.

It is apparent from these results that sulphathiazole is an effective drug in cerebrospinal fever, yet the concentration of the drug in the C.S.F. is much lower for a given dose than that of sulphanilamide and somewhat lower than that of sulphapyridine. Even in the blood-stream, concentrations higher than 6 or 7 mg. per 100 c.cm. are rarely obtained owing to the rapidity of absorption and excretion. The concentration curve in the C.S.F. does not follow that in the blood, but flattens out as the blood-concentration rises, so that it seldom rises above 1·5 mg. per 100 c.cm. Only in one patient, a lad of eighteen, was the concentration in the C.S.F. as high as 3·1 mg. When the concentration in the blood is at its highest the value in the C.S.F. is only about 15% of that in the blood. In the early and late stages of the period of administration, however, the concentration in the C.S.F. may reach as high as 40% of that in the blood.



The graph given here is a composite one representing a simultaneous blood and C.S.F. estimation in 8 different patients of widely different ages and at different times after the beginning of treatment. Care has been taken to eliminate any cases in which the previous administration of sulphapyridine might invalidate the result. The ages of the 8 patients represented in the successive estimations were 15, 50, 15, 54, 8, 3, 19 and 35.

Table III gives the concentrations in the C.S.F. of 15 other cases in different age-groups. All cases represented in the graph and table were treated according to the standard dosage scheme, with its much higher dosage in proportion to body-weight at the younger ages. Nevertheless this factor appears to have had little influence on the concentrations in the C.S.F. In the 15 cases the average concentrations in the C.S.F. after the beginning of treatment were: at 18 hours 0·8 mg.; at 36–40 hours 1·05 mg.; at 48–60 hours 1·29 mg.; at 96 hours or later 0·5 mg. per 100 c.cm.

TABLE III—CONCENTRATION OF SULPHATHIAZOLE IN C.S.F. IN MG. PER 100 C.CM.

Age-group (years)	Cases	Hours after treatment began—			
		18	36–40	48–60	96 +
1–3 ..	4	0·5 1·0	—	1·6	0·6 0·5
6–7 ..	2	—	—	—	0·6 0·3
17–19 ..	2	—	0·83	—	0·5
21 ..	1	—	2·0	1·7	tr.
28–41 ..	6	0·9	0·7 0·9 0·85	1·1 0·78	—
Average 15 cases ..		0·8	1·05	1·29	0·5

Every one of the cases represented in the graph and table recovered rapidly. Accordingly it appears that relatively low concentrations in the C.S.F., varying from 0·8 to 1·3 mg. per 100 c.cm. in the first three days, are effective. It would be unwise, however, to use these data to justify any reduction in the dosage during the initial period.

COURSE OF THE DISEASE WITH SULPHATHIAZOLE

Except for 2 or 3 very severe cases recovery was rapid. Patients were comfortable and rational within twenty-four hours, and children were often found sitting up in bed within this period. After the first lumbar puncture in many cases the C.S.F. was not examined again, since experience has shown lumbar puncture to be unnecessary for treatment, except in rare instances where slow pulse or respirations or great restlessness and headache indicate high pressure in the fluid. However, 46 specimens of C.S.F. were examined within forty-eight hours after the diagnostic lumbar puncture had shown meningococci to be present. Of these, 5 specimens were taken within twelve hours, all of which were free from organisms; 23 were taken from twelve to twenty-four hours after diagnostic puncture, and of these only 6 showed meningococci in films, with no growth on culture; 11 specimens were taken between thirty-six and forty-eight hours after diagnostic puncture and all except one were not only free from organisms but showed a great reduction in the cell-count and a considerable percentage of mononuclears already present. This suggests that bacteriostasis was effected within twenty-four hours; that, in the great majority, phagocytosis of free organisms had also taken place within this period; and that within forty-eight hours the process of absorption of the exudate was well advanced.

The following are examples of very severe cases successfully treated with sulphathiazole.

CASE 4.—A male infant of four months had been vaccinated a fortnight before admission and had been nightly to a public shelter. Severe illness began forty-eight hours before admission. On admission, on Dec. 3, 1940, the infant was suffering from both severe meningococcal meningitis and acute pneumonia. He was cyanosed, the alæ nasi were moving freely and respirations were rapid and grunting. The temperature was 96° F. on admission (a collapse temperature which later rose to 101° F.), pulse-rate about 160, almost uncountable, and respirations 70. Sticky râles all over chest and over the right lower lobe dullness to percussion and coarse moist râles. The skin showed a few petechial spots on trunk and thighs. The neck was rigid. Lumbar puncture produced a few c.cm. of creamy purulent fluid, containing 53,800 cells per c.mm. and meningococci in films and culture (group 1). His condition was desperate and he was given at once 10 c.cm. (0 5 g.) of the solution of sodium sulphathiazole into the jugular vein and put into an oxygen tent, whence he was removed for feeding every two hours. One tablet of the drug (0 5 g.) was given by mouth four-hourly for four days and then gradually reduced. Improvement was very gradual. He remained in the oxygen tent for seven days. His temperature settled to normal in ten days. Pulse-rate remained about 160 and respirations 70 for four days and then gradually slowed. His chest was clear of gross signs within four days but some bronchitis remained for two weeks. On Dec. 16 a blood-count showed secondary anæmia, Hb. 62%, and a leucocytosis of 15,100, with 55% polymorphs. His anæmia was treated and he was soon quite well. It was not possible to determine the infecting organism of the pneumonia. Sulphathiazole was evidently effective, however, against both meningeal and pulmonary infections in an infant whose condition on admission was well-nigh desperate.

CASE 5.—A girl of 15 had about twelve hours' malaise before the onset of intense headache and vomiting. Four hours later she was delirious and comatose, the coma rapidly becoming absolute. She was admitted to a general hospital at one of the most intense periods of the bombing of London, and received at once 1 g. of sulphapyridine intramuscularly, but received no further drug treatment until she was transferred to Park Hospital twenty-seven hours later, on Sept. 25. She was then in absolute coma and totally unable to swallow; mouth and tongue were dry and dirty; skin dry; dehydrated; neck rigid but otherwise general flaccidity. Abdominal reflexes absent. Left sixth cranial nerve paresis. The C.S.F. was very purulent and contained meningococci of group 1 in films and culture. Immediate treatment was 2 g. sulphathiazole (40 c.cm. of 5% sodium solution) intravenously followed in two hours by 1·5 g. by mouth and then 1·5 g. four-hourly. Fluids and drug were given freely by stomach-tube and continuous drip rectal saline was also given. Next day she was still in absolute coma and unable to swallow; moist sounds at the bases of lungs; C.S.F. contained 17,000

cells but no organisms. Coma still absolute on Sept. 27; she was unable to swallow but was now beginning to show a slight response to stimuli; loose cough present; fluids and drug had been given by tube for forty-eight hours. Next day there was definite improvement; she did not speak but was able to swallow; left and right sixth nerve paresis, more severe on the left; blurring of the margins of optic discs and slight papilloedema. On Oct. 3 C.S.F. contained 24 cells per c.mm. and no organisms. Next day papilloedema had disappeared. Thereafter her progress was rapid. She was discharged well except for left internal squint on Nov. 4.

Convalescence was so rapid that almost all patients except those with arthritis or deafness were discharged within three weeks of admission, some in just over two weeks. On discharge it was noted that the tendon reflexes, particularly knee- and ankle-jerks, were as a rule still exaggerated, and the C.S.F. might contain up to 10 or 15 lymphocytes per c.mm. There were no clinical disabilities, except in the complicated cases. These occasionally showed slight residual paresis of the sixth and seventh nerves, some joint stiffness in certain cases of arthritis, and the deafness already referred to.

The management of cases on sulphathiazole treatment is relatively easy owing to the comparative absence of toxic effects. Vomiting produced by sulphapyridine was generally checked when the drug was changed to sulphathiazole. If vomiting does occur the tablets should be repeated, and if it persists the sodium solution should be injected intravenously in place of treatment by mouth. One or more intravenous injections should also be given to every severe case.

PROGNOSIS

Tables I and II show that the age-groups with the worst prognosis are still under a year and over forty, though this feature is not nearly so clear-cut as in the days of serum therapy. When chemotherapy is adequately applied the determining factor in prognosis appears to be the fulminating type with or without adrenal hæmorrhage. This may occur at all ages but is probably most frequent in infancy, as was actually seen during the 1940 epidemic. In elderly subjects a secondary factor of some importance in prognosis is intercurrent organic disease. The prognosis in elderly subjects, however, is now immensely improved. Of 29 cases over forty treated during 1940 there were only 2 deaths, one a fulminating case and the other due to hypostatic pneumonia in a man aged seventy-four.

SUMMARY

In the post-epidemic period of 1940, 96 consecutive cases of cerebrospinal fever were treated with 2 deaths. In 52 cases sulphathiazole was used after one or more preliminary doses of sulphapyridine, and in 44 cases sulphathiazole was used alone. The fatality-rate of cases treated mainly or wholly with sulphathiazole was 2·1%, which compares favourably with previous series treated with serum and sulphanilamide and with sulphanilamide or sulphapyridine alone or combined.

Sulphathiazole, though not yet tested in epidemic conditions, has rapidly cured some very acute cases. The evidence so far suggests that it is at least equal in potency to sulphapyridine in meningococcal disease. There is evidence that, with adequate dosage, bacteriostasis is complete and phagocytosis advanced within twelve to twenty-four hours.

Concentration in the C.S.F. varies from about 15 to 40% of that in the blood, and rarely is greater than 1·5 mg. per 100 c.cm. even on high dosage.

The comparative rarity of nausea, vomiting and dehydration, and the absence of depression and mental confusion, make the treatment with sulphathiazole more pleasant, and the management of the case easier than with sulphapyridine. Other toxic effects are also rare. High dosage is well tolerated.

One or two intravenous injections of the 5% sodium solution are recommended in all severe cases and where vomiting persists.

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TREATMENT OF WAR NEUROSIS

BY

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SINCE the beginning of the war over 1500 cases of neurosis or psychosis in members of the armed forces have been treated in this hospital and the more important conclusions drawn from this experience may be of use to those dealing with similar problems.[1]

The cases have ranged from the extremely chronic to the most acute. In the early months of the war they consisted largely of men who, had all the facts been known, would never have been regarded as fit for military service—mental defectives, epileptics and the chronically anxious or hysterical—who had broken down at once under the stress of active-service conditions and removal from home. They included a large number of the constitutionally abnormal, but most of them were not openly concerned to make the most of their symptoms. With the onset of violent fighting and at the evacuation from Dunkirk different types of case began to appear—acute anxiety or exhaustion syndromes in men of comparatively normal personality, who had not broken down until placed under considerable strain. In these the prospects of treatment were good, and most of them could be returned to the Army in capacities where the strain was not likely to reach the same level again. Since then cases of a third type have appeared in men who have broken down under aerial bombardment in this country. The strain experienced has never reached the intensity endured in the Dunkirk episode, and it is not surprising to find that these patients are of feebler stamina, and that the constitutional element was once again well to the fore. What has been surprising, however, is that hysterical mechanisms have been much more superficial in many of them, and in a few have almost reached the level of open malingering; to others even the most cautious psychiatrist might be tempted to apply the term "scrimshanker." It may be that these men, breaking down at a later stage in the war, and being less obviously unfit for service, feel that they must bolster up their illness with adventitious aid; or rather, perhaps, evade further unpleasant necessity by refusing to consider the possibility of natural recovery.

THE AIM OF TREATMENT

With the neurotic war casualty, to a much greater extent than with the private patient of peace-time, treatment has to be limited by practical possibilities. We hold, contrary to some, that it is impossible by psychotherapy to reconstitute the make-up of the personality; that the neurotic cannot be freed of his neurotic tendencies. In any case, radical psychotherapy is out of the question in war conditions, if only because of the time required.

1. Apart from a proportion of very acute cases, our material closely resembles both diagnostically and prognostically the Naval material analysed by Desmond Curran and W. P. Mallinson (*Lancet*, 1940, **2**, 738).

Treatment has three practical goals: to deal with the symptoms and to bring about a return to the condition before the breakdown; to re-adapt the patient to a socially valuable life; and so to arrange his future that strains that are for him intolerable will not have to be endured again. If this can be done within the framework of Army life, so much the better; if not there must be an effective re-adaptation for civilian life. The Army is not organised to provide a shelter for neurotics, and neurotic casualties throw more grit into the machinery than a corresponding number of organic casualties. It is no good sending back into the Army, merely because he is symptom-free, a man who is liable to break down under small strain. It is necessary, by accurate history-taking and a quantitative as well as qualitative diagnosis, to make an assessment of the personality and of the strains that it is and is not able to support. Judgment is more likely to err towards optimism than in the opposite direction, for there is a natural bias against invaliding any man unless it is absolutely necessary. Each one of us has seen return cases of men who had been sent out fit for home service and had unexpectedly proved unfit even for that. They had gone to their units, had spent weeks on light duty or no duty at all, no-one knowing what to do with them, and had caused great trouble and difficulty before they were finally returned to hospital, disgruntled and resentful. The longer a neurotic reaction is allowed to persist, the more difficult it is to deal with; among the neurotically predisposed, emotional attitudes such as disgruntlement, panic, or scrimshanking are highly infectious. Every consideration urges, therefore, that if treatment is to be effective it must be quick, and limited to an aim that is quickly obtainable.

PSYCHOTHERAPY

Psychotherapists will agree that the most important factor for the success of treatment is a real desire on the patient's part to get well, even when that involves a degree of sacrifice and a painful self-realisation. The reward is a greater freedom from hampering difficulties, a greater capacity for enjoyment, and a knowledge and acceptance of those fundamental circumstances which are incapable of change. The military case, however, differs from that of peace-time in that treatment encounters the same difficulties but does not offer the same reward; and that illness can secure a fundamental change in life, which is not otherwise to be obtained. The soldier is uprooted from an environment to which after years of painful endeavour he has made some sort of adjustment, even if a neurotic one; he is forced through a military mill and subjected to previously unimagined strains. Then, when illness comes, it may be weeks or months before even the possibility of treatment is reached. By the time he reaches the psychiatrist he is a man with a grievance, sullen or apathetic. And all the reward that is offered for cure is, to his mind, the privilege of returning to the scene of his failure in the knowledge that he has failed.

Treatment, then, is faced with unusual difficulties, and must be pragmatic. In late and less favourable cases it is wise to limit its aim to getting the patient well enough to return to his job as a civilian. The patient is best told that he will be recommended for discharge; and an attempt is made to show him that his grievances are understood, and to remedy any sense of failure or worthlessness he may have acquired. He needs to be assured that he can serve his country equally well as a civilian; and there are few who are not eager to accept this point of view. Most of those who have broken down after little or no strictly military stress have to be so treated; and so have veterans of the last war, of whom significantly many have a history of previous "shell-shock." There is more hope for those whose breakdown has been precipitated by promotion or by the conflict over putting in for it; but care must be exercised here, as a seemingly situational neurosis may be firmly rooted in the personality.

AMNESIAS

In the acute war neuroses there is a considerable tendency to spontaneous recovery. But even if acute symptoms abate, an effort should be made to clear up amnesias and to let the patient re-experience the violent emotions that battle scenes have aroused. This process —abreaction—has a prophylactic as well as an immediate therapeutic effect. It may be induced by various means, according to taste and experience. The slow intravenous administration of a suitable narcotic (such as sodium amytal gr. 5–7½) is quick, effective, and of particular use to those unversed in hypnotic and analytic techniques. Before it is begun a good rapport must be established and coöperation gained. The patient should be told that certain painful memories are buried in his mind and are responsible for his symptoms, and that he will get better when they are dealt with. The anamnesis under the drug may be sudden and violent; in which case it is essential to give the patient time to weather the emotional storm, and to help him by an attitude of understanding and detachment. At other times it may be necessary to use firm and persistent questioning to overcome resistance. Sometimes actual memories are falsified by or mixed with fantasies; this may be made use of in subsequent interviews, in giving the patient insight into the deeper causes of his anxiety. Other varieties of behaviour under narcosis have been observed. Tremors, stammers and other conversion symptoms usually disappear under the drug; and an attempt should be made by suitable suggestion, and by continuing the interview until the patient is fully conscious, to prolong the improvement into the waking state. Though much may be done in one session, it is nearly always necessary to cover the ground again, exploring deeper into obscure episodes, laying bare amnesias previously unsuspected, relating specific anxieties to the forgotten events, and familiarising the patient with the emotions he has suppressed.

The psychopathology of war neuroses is more complex than has been described by some writers who gained their experience in the last war. Apart from the nature of the precipitating agent, the structure of the cases seen so far, especially late cases with much anxiety and depression, has resembled that of the occupation and post-traumatic neuroses of peace. Differences are shown in the striking regressions that often follow being oneself, or seeing others, blown up, and in the temporary disturbance to the sense of reality caused by the bizarre effects of high explosive. The most fantastic dreams are suddenly realised, as though by magic, in actual life; and the mind regresses to primitive mechanisms appropriate to the time of life when such fantasies seemed real. The experiences of war provide a stimulus to aggressive and sadistic impulses, with the consequence that guilt and its associated depressive affect are very common; or projection mechanisms may come into play, the man believing that every 'plane is coming specially to punish him. The therapeutic aim is then to make him aware of latent hostilities, to give him an opportunity of expressing them in a reasonable way, and to increase his confidence in his powers of control.

HOSTILITY

Special problems are offered by the patients who show a marked hostility during treatment in hospital. The aggressive reaction may be that of a constitutionally unstable personality to an unfamiliar environment. These men have been social misfits all their lives, and their neurosis is the expression of failure to adapt to the Army; their asocial activities in hospital are usually childish; they defy discipline, or break bounds without reasonable gain—behaviour which is difficult to deal with, and has a bad effect on others of better personality. As the prospect of a useful Army career is usually minimal, it is well to secure their discharge at the earliest possible moment, and to give them priority when it comes to boarding. Aggressive reactions with a paranoid tendency are also seen in men of comparatively good personality with acute anxiety states, usually during recovery from the acute stage of the illness. The phenomenon is part of the illness, and is to be treated as such. In many of our cases it could be regarded as an over-compensation for loss of self-esteem, as the meaning of the illness became clear.

Cases complicated by an organic factor offer special problems. Neurosis commonly follows a post-concussive state, and it is important to decide how far the influence of the injury extends. It is harmful to keep patients in bed for more than two or three weeks in an attempt to prevent post-concussive headaches; the subsequent illness is more prolonged. It is well to acknowledge that headaches do occur after concussion, but to make little

of them; anxiety symptoms, however, should not be shelved. The chief danger is that the patient will sidestep his problems and use an organically determined symptom to evade further responsibility. Where hysterical mechanisms come into play and replace anxiety, the illness is likely to become progressively more difficult to treat.

PHYSICAL TREATMENT

Drug therapy of the acute neuroses has been dealt with in a previous communication.[2] Since that report we have had to treat a considerable number of cases which had been acute and have now become chronic. Treatment of an acute neurosis is almost as urgent as that of the acute abdomen. Whether treated in hospital or not, these chronic cases had received no adequate sedation in the acute phase and they had been returned to duty too soon. Conversion symptoms had been allowed to persist, and large periods of amnesia had been left untouched. By the time they arrived for treatment here the neurotic reaction had become fixed and prospects of return to full duty were almost hopeless. It is of the utmost importance that the acute neurotic should receive effective first-aid as soon as he is seen.

Apart from the treatment of acute panic reactions, physical and biochemical methods have their place in speeding up recovery in the later stages. As always, the success to be expected depends on the previous personality, and good results cannot be expected from poor material. In addition to sleep therapy, a modified form of insulin treatment is useful in some cases for breaking down the vicious circle of anxiety and loss of weight. Increasing doses of insulin are given in the mornings, up to a maximum insufficient to produce coma or hypoglycæmic excitement, followed three hours later by 12 oz. of potatoes or 7 oz. of sugar. The treatment is without any of the risks associated with insulin coma, and generally produces a rapid gain in weight and improvement in physical condition. Furthermore, the insulin often exercises a sedative effect, which may last for the whole period between administration and interruption.

Full psychological recovery is rare without the restoration of good physical health. The mere appearance of physical fitness is often deceptive, and on inquiry remarkable changes in physique will often be found, including loss of weight up to 2 or 3 stone. In all forms of drug therapy the aim should be, by a large intake of fluid and food, not only to abolish the anxiety but also to remedy the metabolic disturbances due to, and conducing to, its continuation. Only when his normal physique is restored is the patient fully accessible to psychotherapy and rehabilitation.

OCCUPATIONAL THERAPY

The occupational technique worked out at this hospital has been described by Cameron.[3] Occupation is even more valuable for the sub-chronic than for the acute neurotic, and for a stabilised return to a normal working civil life it is almost indispensable. Its value as a distraction from neurotic preoccupations can be used even during the operation of stress. Our patients were much better when kept at work during air-raids than when allowed to congregate in cover-points and places of greater security. When allowed to seek the greatest available security the men became preoccupied solely with the desire of finding a Utopia where they would *feel* safe, and from spending nights in open trenches the more panicky took to breaking bounds in order to sleep in public shelters. Such breakdown of control has its penalty in heightened anxiety; and the remedy is to deal by sedation with the subjective fears which, rather than the real dangers, are the effective noxus.

MEDICAL BOARDING

The problems of necessity for boarding and proper boarding category should be faced as early as possible, for they inevitably influence the line that treatment itself will take. If invaliding is indicated, the desire of the patient to evade further military service can be used to aid recovery rather than to perpetuate illness; he can be told, for instance, that he will be recommended for discharge, but only when he has recovered from his symptoms. A healthy civilian is of more value to the country than a sick soldier. Problems of boarding have been more difficult of late; for now the position of the man boarded "C" is not much easier than that of one still marked "A."[4] We have found that men passed suitable for service not involving strain have been sent to guard points subjected to heavy bombing, which has promptly precipitated a new breakdown. Suitable employment within the Army framework is difficult to find, even for the neurotic of fairly good personality; and mistakes are costly. These tragedies would be fewer if the vocational recommendations of the psychiatrist had any force.

We do not believe that invaliding out, if done carefully, will greatly add to the number of neurotic casualties, or that there is any risk of an epidemic of neuroses. Certainly the prompt removal of the constitutionally unfit from the Army aids its efficiency and obviates much chronic invalidism. Since there are at present no pensions for war neurosis, it is important that the neurotic should be re-adapted to a working life before the question of pension arises; and, owing to conditions in the labour market, this is much easier now than it will be when peace comes. After this war the country must not be burdened with the large numbers of pensioners that crowded psychiatric clinics and Government hospitals for many years after the last war, who are, indeed, still with us. A proper settling of the questions of attributability is still awaited; but when the time for this arrives it is to be hoped that the authorities will not lose sight of the malignant influence that the award of a premium for illness exercises on the neurotically predisposed.

SUMMARY

The principal conclusions derived from the investigation of a large number of military neurotic casualties are:—

1. The nature of the material admitted to hospital varies with the progress of the war, and with the different types of strain that war from time to time imposes. Similar variations can be expected in the future.

2. At times, large numbers of cases will be seen in which there is a semi-deliberate magnification of symptoms.

3. Treatment has to be adapted to what is possible in a short space of time. It should not be aimed too high.

4. Psychotherapy is faced with unusual difficulties in war-service cases. Both from the structural and therapeutic points of view they closely resemble, with specific differences, unsettled compensation cases of peace-time. Quick abreactive techniques have a special value. Special problems are offered by cases with aggressive tendencies, and those arising after head injury.

5. Medical first-aid is of the utmost importance. Physical methods of treatment are very useful, and should have as a principal aim restoration of normal metabolism.

6. Occupational therapy is also valuable, even more for chronic than for acute cases.

7. Over-optimism is to be avoided, and too much resistance should not be offered to invaliding the patient. The constitutionally unfit must be weeded out of the Army; and for his own sake the unfit soldier should be returned to civilian life fit for work as early as possible.

2. Sargant, W. and Slater, E. *Lancet*, 1940, **2**, 1.
3. Cameron, K. *Ibid*, p. 659.

4. Roughly speaking, categorisation as "A" signifies that the soldier is fit for all duties, as "B" that he is fit for all duties within limits (e.g., that he should not be submitted to great strain and exposure), and as "C" that he is fit for home service only.

The Minister of Health on Jan. 17 in a broadcast appeal to nurses said that now during the coldest winter months was the time for those who have had training and experience in fever and tuberculosis nursing to give their special help to the nation. We needed fever-fighters as well as fire-fighters. Nurses who were employed in any branch of the public-health services should stay where they were, but fever nurses who were employed in some other form of nursing should speak to their matron and write to him at the ministry or to the Secretary of State for Scotland at St. Andrews House, Edinburgh. Members of the Civil Nursing Reserve who were unemployed at the moment would be temporarily released from their obligations if they were needed in the epidemic season.

A PNEUMOCOCCUS WHICH REQUIRED CO_2 FOR ITS GROWTH

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AT this season many bacteriological examinations are being made in connexion with respiratory catarrhs, and in the light of the experience here detailed it seems possible that certain important organisms may be completely missed by ordinary methods of culture.

A laboratory worker contracted a "cold." The original clear discharge from the nose had by the fourth day become very profuse and mucopurulent. A casual examination of a gram-stained film of this discharge showed many capsulated diplococci, but cultures made on blood agar and on boiled blood agar gave a pure growth of *Bacillus influenzæ* (Pfeiffer). The next day a fresh sample of mucopus was examined microscopically with greater care, and in addition to capsulated gram-positive diplococci many small gram-negative bacilli resembling *B. influenzæ* were observed. Cultures on blood and boiled blood agar again gave pure growths of *B. influenzæ*. These examinations were repeated on the next two days with exactly the same results.

The position, therefore, was that in the nasal pus there was a heavy infection of what appeared to be a pneumococcus, which had on four separate occasions refused to grow on a culture medium which should have been suitable (5% horse-blood agar). At this stage I remembered having been informed by Dr. Gleeson White at a demonstration given at a laboratory meeting of the pathological section of the Royal Society of Medicine that some pneumococci required for their growth an atmosphere containing an increased amount of CO_2. I therefore planted the nasal pus on two blood plates, one of which was incubated in the ordinary way, and the other in an atmosphere containing roughly 10% of CO_2. The plate incubated without CO_2 again gave a pure culture of *B. influenzæ*, whereas on the plate grown with CO_2 there were in addition numerous large mucoid colonies of pneumococcus which proved to be of type III. The same procedure was repeated five times during the next week, always with the same result. These results clearly show that there are pneumococci which do not appear in culture on blood agar unless an increased amount of CO_2 is present in the atmosphere.

The method used for growing the organism in CO_2 was very simple. The container was a metal can with a "push-in" lid wide enough to hold the culture plates, and with a total capacity of about 2 litres. The inoculated plates were placed in the can, CO_2 was run in from a Kipp's apparatus, and the lid firmly replaced, but not sealed in any way. On different occasions amounts of CO_2 from about 100 c.cm. to 300 c.cm. were added, and with all there was the same copious growth of the pneumococcus. There is, therefore, considerable latitude in the amount of CO_2 which may be added.

The pneumococcus was subcultured daily on blood-agar slopes which were incubated in air and in air plus CO_2. For the first three days there was no growth without increased CO_2 in the atmosphere. The fourth subculture grew (badly) in air, the fifth better, and the sixth grew equally with and without added CO_2. The first four of these subcultures were, of necessity, made from the culture grown in CO_2. The remaining ones were made from the cultures obtained in ordinary air.

The colonies obtained in CO_2 from the original muco-pus did not differ in any perceptible way from ordinary type-III pneumococcus colonies. When the organism was acclimatised after six subcultures the colonies in ordinary air were perfectly normal type-III colonies.

This series of observations is striking in that on ten separate occasions the pneumococcus which could be seen in nasal pus failed to grow on blood agar when incubated in the ordinary way, but grew well when CO_2 was added in every one of six trials. In clinical bacteriology it is the custom to examine films of nasal secretion or sputum when such are sent to the laboratory, and thus the cultural results are checked. It is not, however, so common for postnasal or throat *swabs* to be examined microscopically, and if this is not done there may be a pneumococcus (or other organism) which will not grow except when CO_2 is added, and such an organism would be completely missed, even if it were the most important part of the infection.

A number of postnasal swabs have been cultured on blood-agar plates with and without added CO_2, and in no case was an organism found which grew less luxuriantly in an atmosphere of 5–10% of CO_2. It might, therefore, be an advantage to incubate all cultures from the respiratory tract in this way. The technique is easy and does not involve any serious expenditure. All that is wanted is a reservoir of CO_2 (a Kipp's apparatus, or a cylinder of the gas) and a metal can of suitable size (such cans are used as containers of children's foods and other things). The CO_2 reservoir can even be done away with by adopting the procedure described by Gladstone and Fildes [1] (1940).

The observation that some pneumococci will not grow unless CO_2 is added is not new. I have already mentioned that Dr. Gleeson White made a similar observation, and Khairat [2] found in blood-cultures certain organisms, including one pneumococcus, which grew badly or not all unless with added CO_2. In spite of this it does not seem to be generally known among bacteriologists that these cultural requirements exist.

CONCLUSIONS

The lessons to be learnt from this case are :

1. The simple microscopical examination of infected material should not be omitted. If the nasal mucopus from the case cited had not been examined microscopically it is likely that the profuse pure culture of *B. influenzæ* would have satisfied most bacteriologists that there was a simple *B. influenzæ* infection, but the examination of a gram-stained film made it at once obvious that the culture gave a misleading picture.

2. Even on what is regarded as a suitable culture medium a common organism may fail to develop unless CO_2 is added to the atmosphere.

1. Gladstone, G. P. and Fildes, P. *Brit. J. exp. Path.* 1940, **21**, 161.
2. Khairat, O. *J. Path. Bact.* 1940, **50**, 491.

Medical Societies

ROYAL SOCIETY OF MEDICINE

AT the joint meeting of the sections of Surgery and Pathology on Jan. 8, with Mr. J. B. HUNTER in the chair, a discussion on the

Problem of Blast Injuries

was opened by Prof. S. ZUCKERMAN, who gave an account of experimental work carried out by members of the Department of Human Anatomy, Oxford, for the Research and Experiments Department of the Ministry of Home Security. It has become recognised, he said, especially since the Spanish war, that the blast of high explosives can kill or injure people without causing external injuries; in such cases the most prominent internal lesions are hæmorrhages in the lungs. Similar pulmonary lesions, and hæmorrhages in parts of the central nervous system and in some abdominal organs, have been observed during the 1914–18 war in experimental animals that have been exposed to blast. To understand how these lesions occur it is necessary to know something about the nature of blast. When a high explosive detonates a relatively small amount of solid becomes converted almost instantaneously into a very large volume of gases which by their expansion produce a blast wave in the surrounding air. The wave is a single pulse of increased pressure followed by a phase of suction, and it moves very rapidly, falling, in the case of a medium-sized bomb, to the velocity of sound (1120 ft. per sec.) at about 200 ft. from the explosion. The total duration of the whole wave at any given point is brief, the pressure component close to a charge seldom lasting more than 5 millisec., and the suction component about 30 millisec. The maximum pressure of the wave is highest in the region of the explosion, but it rapidly falls, especially at first, the further the wave moves. Thus excess pressure in the neighbourhood of a heavy explosion may be as much as 150 lb. per sq. in., whereas 50 ft. from the bomb the excess pressure may be no more than 5 lb. Experiments

on various species of laboratory animal have shown that different animals vary in their susceptibility to blast, and that animals exposed close to an explosion suffer more than those further away. Small mammals like rabbits are usually killed instantaneously at excess pressures greater than 50 lb. per sq. in. At higher pressures close to the explosion they would be blown to pieces, while at slightly lower pressures they survive for a brief period, their symptoms during the interval they live after exposure usually including dyspnœa and tachypnœa. Blood-stained froth is also occasionally present in the upper respiratory passages of such animals, while knee-jerks, corneal and pupillary reflexes are normal immediately after an explosion. Animals exposed to slightly lower pressures do not die, and externally appear to be unaffected by the explosion. Internally, however, they exhibit changes in thoracic, and occasionally abdominal organs. At still lower pressures (e.g., excess pressures of 5 lb. per sq. in.) animals are affected neither externally nor internally.

The most outstanding lesions are hæmorrhages, varying in extent, on the surface and in the substance of the lungs. When animals have been exposed to minor degrees of pressure lesions are slight, whereas the lungs of animals exposed to high pressures may be one mass of hæmorrhage. Lacerations are also found. The lesions are detectable radiologically, and they clear up fairly rapidly. Hæmorrhagic lesions are also occasionally observed in the thymus, in the pericardium and epicardium. In about 40% of cases in which pulmonary hæmorrhages occur, hæmorrhagic lesions are also found in abdominal organs. The most susceptible abdominal organ is the large intestine. Hæmorrhages (and occasionally lacerations) have also been observed in the small intestine and stomach, the liver, the spleen, the kidney, the adrenals, the bladder and the uterus, while retroperitoneal as well as intraperitoneal hæmorrhage may sometimes be present. In the head hæmorrhages have been observed in the fascial planes of the orbital cavity, and at high pressures the ear-drums may be ruptured. The central nervous system appears to be affected only at relatively very high pressures. No lesions have been observed in the brains of monkeys, which, however, show hæmorrhages around the spinal roots, especially in the thoracic region. A zone of œdema around the central canal is also generally observed in monkeys exposed to high blast pressures. In rabbits the nervous system appears to be more sensitive than in monkeys, and, apart from spinal-cord changes, pial and ventricular hæmorrhages have occasionally been observed on and in the brain of these animals.

Experiment has shown that the pulmonary and abdominal lesions are due to the impact on the body wall of the pressure component of the blast wave. Thus animals exposed to explosions so that one side shields the other receive lesions only on the side facing the explosion; while animals whose body walls are clothed in a sufficient thickness of sponge rubber are far less injured internally than are controls. The unilateral disposition of the lesions according to the circumstances of exposure argues against any theory which postulates that the lesions are due to some general effect—for example, to pressure changes occurring by way of the upper respiratory tract. Observation has also shown that fat emboli are not present in the lungs of animals killed by blast, and that the lesions cannot be attributed to back pressure in the pulmonary circuit, even though such pressure does cause hæmorrhages which in some respects are similar to those caused by blast. The pulmonary and abdominal injuries due to blast may thus be compared with those which occur, without open wounds, as a result of severe falls or direct blows to the body wall.

Turning to the clinical aspects, Professor Zuckerman pointed out that in air-raids people are exposed not only to the direct effects of blast but also to indirect effects such as violent displacement, secondary missiles and falling masonry. A specially conducted casualty survey has shown that the direct effects of blast, such as have been observed experimentally, are experienced only close to an explosion, and it follows that relatively few people who have been injured in air-raids can have been exposed in circumstances where they would have received primary blast injuries. Pulmonary hæmorrhages cannot be regarded as an exclusive sign of primary blast injury, which can only be diagnosed when the full circumstances of injury are known. Cases that have been described as primary blast effects may indeed have been due to such secondary blast effects as violent falls or the impact of flying masonry.

He gave examples of people who had been killed by the direct effects of blast, of people whose death was due either to a combination of primary and secondary effects, or to secondary effects alone, and of people who had received non-fatal internal injuries as a result of the impact of a blast wave. Physical signs are not prominent in such cases, which are, however, detectable radiologically. In making diagnoses of blast injuries, Professor Zuckerman suggested that attention should be paid to the condition of the ear-drums, which would probably be ruptured at the higher blast pressures that cause lung injuries.

Prof. GEOFFREY HADFIELD reported on 30 post-mortem examinations that had been carried out on victims of air-raids. In some 8 of these there were no significant external injuries, and in 4 pulmonary hæmorrhages were associated with a high degree of carbon-monoxide saturation of the blood. Of the 30, 2 had died of compression asphyxia and 3 from asphyxia due to the inhalation of the dust of debris; 22 showed pulmonary hæmorrhages, which were rarely marked on the surface, and which were sometimes extensive within the substance of the lungs. Rupture of alveolar walls was not a prominent microscopic finding, and as a rule alveoli filled with blood had intact walls. The primary lesion in these cases was, he felt, a widespread dilatation and congestion of the alveolar capillaries from which diapedesis probably occurred into the alveoli. His observations suggested that hæmorrhagic lesions are usually more extensive in people who do not die immediately than in people who are killed; and he felt that bleeding may continue into the lung for at least 48 hours after exposure to blast, causing consolidation of large areas. Consolidation is often associated with leucocytic and monocytic infiltration. Professor Hadfield pointed out that his remarks were founded on what he described as a very short experience, and in view of Professor Zuckerman's observations about the similarity of internal injuries due to blast and those due to violent falls or the impact of falling or flying masonry, he did not claim that the cases he described were due to the direct effects of blast. There is little opportunity for obtaining suitable material for investigation, and it is therefore difficult to sort cases and disentangle the incident. The observation that bleeding into the lung may continue for days is, he felt, significant since it means that patients with symptoms suggestive of lung injury should be kept immobile and treated as for hæmoptysis.

Dr. J. N. O'REILLY described 3 non-fatal cases which he had treated, and emphasised that within a very short period they had become apparently ordinary clinical lobar pneumonia. In 5 other patients who were brought in from the same incident the appearances were those of an acute abdominal catastrophe. In 2 of them symptoms were sufficiently pronounced to justify surgical intervention, but nothing was found at operation except a few minute subserous hæmorrhages. Dr. J. M. ALSTON inquired whether animals which survived exposure to blast manifested signs of pseudopneumonia similar to those described by Professor Hadfield in humans, and Dr. BERYL BARSBY referred to 2 air-raid casualties whom she had treated and in whom internal injuries, including a spontaneous hæmothorax, appeared to be due to blast.

In replying, Professor ZUCKERMAN remarked that although hæmorrhagic lesions in the lungs often appeared to be better demarcated in animals which survived than in animals immediately killed by blast there was no evidence that the bleeding continued in the sense of an extension of primary zones of hæmorrhage. Consolidation of the lungs associated with leucocytic and monocytic infiltration had been observed in animals, and appeared to be similar to the changes described by Professor Hadfield. In conclusion, he re-emphasised the point that without knowing in detail how a casualty had been injured in an air-raid it was impossible to decide whether lung damage was due to the primary or secondary effects of blast, or to a combination of both.

ASSOCIATION OF CLINICAL PATHOLOGISTS

SCIENTIFIC MEETING WITH DEMONSTRATIONS

AT the Sir William Dunn School of Pathology, Oxford, on Jan. 4, Prof. A. D. GARDNER demonstrated the diagnostic work—now centred at Oxford in the Emergency Public Health Laboratory Service—on specimens of sera received from patients thought to be suffering from infection with *Leptospira icterohæmorrhagiæ*. Specimens of sera from the pre-jaundice stage were wanted. It might be possible, he suggested, to make an early diagnosis from the extreme weakness in the febrile stage, muscle pains, photophobia with red conjunctiva, and vomiting. The work of most of the patients hitherto examined exposed them to direct infection from rats—e.g., sewer men, canal hands, farm labourers and a pumper from air-raid shelters.

Dr. JOAN TAYLOR demonstrated the identification of the various salmonellas by preliminary cultural tests followed by serological analysis with the standard specific and group-agglutinating sera. She would prefer to call these by their figure and letter constituents rather than the town or district of origin. She discussed slide and tube methods of titration of agglutinogens; both, she said, were needed. Craigie's use of a small inserted tube in a culture tube of "sloppy agar" often provided rapidly, from the top layer of the surrounding agar, culture of the most motile bacilli required for testing the flagellar H element.

Dr. A. H. ROBB-SMITH demonstrated the histology of lymph nodes. Glands from the inguinal region were often too fibrous while those from the upper cervical chain might show a confused picture owing to former inflammation from teeth and tonsillar lesions; the best gland should be chosen by the clinical pathologist, generally one from the lower cervical chain or the axilla. The whole gland should be carefully excised and immediately fixed. Section before fixation enabled the capsule to retract and so distort the finer details of structure sought by the pathologist in the follicles, sinuses or medulla of the gland.

Dr. C. L. COPE resumed his work on pregnandiol (cf. LANCET, 1940, **2**, 158). The absence of pregnandiol in the urine after a threatened miscarriage, he said, enabled the gynæcologist to assume with some confidence that the fœtus was dead.

Captain L. HANSEN described the estimation of the amounts of sulphanilamide, sulphapyridine or sulphathiazol present in the blood after their administration, either orally or parenterally. Difficulties arose because the same dose in different patients might yield different concentrations in the blood, or even in the same patient on different occasions. The conjugated acetylated forms of the three substances were inactive. Even a trace of Novocain, accidentally admitted from the needle used to the specimen, might falsify the colorimetric determination.

After dinner at Oriel College a discussion took place on the regionalisation of hospitals in the future and its effect on clinical pathology. Much emphasis was laid on the direct relationship that should exist between the pathologist and the patient; the sending of specimens by post and the resulting divorce of the pathologist from access to the patient was deplored.

Reviews of Books

Surgery of Modern Warfare

Part 2. Edited by HAMILTON BAILEY, F.R.C.S. Edinburgh: E. and S. Livingstone. Pp. 160. 12*s*. 6*d*.

WITH the publication of part 2 "Surgery of Modern Warfare" gets fairly into its stride. The chapter on skin grafting is completed and there are full accounts of the war surgery of the chest, abdomen, genito-urinary system and arteries. The overlapping and contradictions which to some extent marred the value of part 1 are here nowhere in evidence. A battery of experts fire their salvos with precision and effect, and Mr. Hamilton Bailey is well justified in saying "What they have to say must be authoritative." For all that a contributor, however eminent, should spare us such expressions as "Pluriviscera damage augments mortality; multiregional injury determines a heavier death-roll." The chapter on wounds of the chest covers most of the ground in a short space. The genito-urinary system is discussed by four authors each of whom has given us a clear and concise account of the problems involved in this branch of surgery. The final chapters deal with the surgery of the arteries and include a discussion of the different types of tourniquet in common use. The two chapters on the surgical approach to the arteries are stimulating. The author of them has wisely assumed that the anatomist, not God, decided that the third part of the axillary artery should become the brachial artery at the lower border of the teres major; and that to describe two methods of approach to this continuous structure is superfluous. Throughout, the essentially practical methods of Fiolle and Delmas have been preferred to the classical approaches described by most textbooks. Thus long skin incisions are advised; the free dissection of tendons and fascia with, if necessary, resection of bone gives the operator a chance to examine carefully the exact source of the bleeding and allows him to ligature only such vessels as require it, thus saving needless sacrifice of the blood-supply to a limb which might otherwise be in danger of gangrene.

Duval's approach to the first part of the anterior tibial artery and Sencert's and Henry's approaches to the first part of the subclavian artery are operations which should only be attempted by the expert working in a properly equipped theatre. The first may save a limb when the more simple ligature of the popliteal artery might cause gangrene. Ligature of the first part of the subclavian is a life-saving measure and these approaches should be mastered by the surgeon. By the perfection of such operations our results will improve. In the last chapter two problems worthy of further investigation are treated, perhaps a little too authoritatively, as settled. The first relates to simultaneous ligature of the vein when the main artery to a limb is ligatured, about which there are still differences of opinion. Secondly, it is advised that a limb in danger of gangrene should be kept at room temperature and not warmed, the argument being that by increasing the temperature of the limb the metabolism of the part is increased and this may be too much for a flagging circulation to control. The circulation is certainly improved by warmth, however, and the question is whether this augmented circulation is in proportion to the increased metabolism, whether it is in excess of the demands or whether it falls short of the new metabolic requirements. Fresh investigation is necessary before this extremely important point can be decided. Finally, although many surgeons will not share Mr. Hamilton Bailey's passion for maggots (a long chapter on which is included), most will understand his reasons for saying "I have learnt more in editing part 2 than by taking a postgraduate course visiting surgical clinics."

War Wounds and Injuries

Edited by E. FLETCHER, M.B. Camb., M.R.C.P., physician in the E.M.S. and to Queen Mary's Hospital for the East End; and R. W. RAVEN, F.R.C.S., surgeon in the E.M.S. and to outpatients at the French Hospital, London. London: Edward Arnold and Co. Pp. 255. 14*s*.

THIS is a collection of articles on the surgery of wounds and injuries that have appeared in the *Postgraduate Medical Journal* during the first year of war. It is therefore a symposium rather than a textbook, a series of essays rather than a comprehensive review. Some of the contributions are written for the young general surgeon, others are more suitable for the expert. The discussion on injuries of the eye and disturbances of vision which occupies sixty pages is of interest above all to the specialist. On the other hand, in the chapter on war injuries of the jaw and face Cole deals with principles rather than details, and gives an insight into the problems of these important injuries that is essential to the surgeon who may have to deal with them in the front line. The excellent group of papers on injuries of the chest by Roberts, Sellors, Price Thomas and Alexander should be very helpful to the young war surgeon, and the slight divergence of views on hæmothorax does not detract from the value of the discussion as a whole. Other contributions of real practical importance, because of their sane outlook and their emphasis on principles, are those on amputations by Seymour Barling, on the surgery of deformities by MacMurray, and on injuries of the spine and spinal cord by Knight.

THE LANCET

LONDON: SATURDAY, JANUARY 25, 1941

TEACHING OF FIRST-AID

WE are beginning to see that our teaching hospitals must become educational centres for everything concerned with the art of healing. Evolution along those lines has developed considerably in the last fifty years: the dental school was attached to the medical school, the nursing, massage and radiographic schools developed in turn, but nowhere has there yet arisen the complete school of healing, where all, except a few seniors, are learning their jobs and passing on to take up posts in other institutions. A new stage in the evolution of a fully comprehensive school has been reached at Queen's Hospital, Birmingham, where a school for training industrial workers in first-aid is to be established as part of the Accident Hospital and Rehabilitation Centre, primarily to meet the needs of firms not large enough to have their own trained nurse or doctor. Here trainees will live in the hospital for a fortnight and act as nursing orderlies. The need for such training centres, extended to meet the needs of first-aiders both inside and outside the factories, is evident, for though first-aid parties are doing and have done valuable work in air-raids it can scarcely be said that all is well with first-aid. Every doctor, of course, has his funny story of how the first-aider shouldered him out of the way; but this would not matter if confidence and competence always went hand in hand.

Training of first-aiders in England has been undertaken by the St. John Ambulance Association and the British Red Cross. The first is primarily a peace-time organisation, and the second, though designed for war, has been chiefly active in training volunteer nurses for hospitals. The textbooks of neither were designed to meet the type of problem presented by air-raids, and the only widely circulated book written to that specific end is the A.R.P. Handbook, No. 10.[1] The result is that training of first-aid parties to meet present emergencies starts with an initial handicap of a syllabus and an examination unsuited to the needs of the moment. Medical lecturers are not devoid of blame. One at least read the book to the class without comment; another occupied half an hour of a four-hour course to wardens in explaining the psychological theory of shock; and another, advising on treatment, startled his hearers by remarking "Just inject a little strychnine—you can't go wrong." Nor are these isolated instances. We can all recall lecturers, able clinicians, whose teaching ability was non-existent. This is not beyond remedy, for teaching is a job with a technique that can be acquired; lecturers must realise this, and remember that the presentation of the facts is as important as the facts themselves. Those who have been teaching or examining first-aiders in recent months are well aware of the recurrent faults of candidates and of doctrine. The avidity with which tourniquets are applied, the unpadded splint hard on the malleolus, the single (proprietary) disinfectant of which they have heard, the fumbling for pressure-points, the incompetent Schafer's method—how familiar they are. Most dangerous of all, perhaps, is ignorance about shock. A correspondent writes: "The first candidate who knows when shock appears and that its effects can be explained from the reduction of blood-volume wins a bottle of beer or a box of chocolates—but we have not had to present a prize in two years." First-aid needs a background of sound first principles or it cannot be applied intelligently; and sometimes even the lecturer lacks the background.

How the proper training and teachers are to be obtained is not easy to answer. An M.O.H. recently expressed the opinion[2] that it is desirable for all members of first-aid posts to be sent to casualty departments for training, and only those who can devote sufficient time to gaining this experience should be retained at the posts. On another page an account will be found of a scheme for a national school giving a fortnight's intensive course in similar fashion to the A.R.P. schools. The proposal is attractive in many ways, but has the questionable purpose of training lay instructors. If the first-aid training now given by doctors is unsatisfactory, training given by lay instructors would scarcely be likely to improve on it. The scheme, however, deserves full publicity so that its strengths and weaknesses can be gauged. In the first place is a fortnight long enough to teach anyone anything in such a way that it will stick? Those who have lectured to nurses know that it is not until the second year that facts learned in the first year become everyday equipment in the student's mind. Only by working with new knowledge over a period of time can we convert it into a familiar tool. A fortnight's course of the kind would be excellent for doctors about to teach first-aid, if they could be induced to take it. They would have both knowledge and experience already, and would need to be told only what was relevant to their purpose and how to present it. But for lay first-aiders some longer preparation is surely necessary. Possibly the student could split his fortnight's training, starting with a week of intensive study and practical experience, under supervision, in clinics and outpatient departments; then returning to his own district for six months to attend routine night or week-end classes designed to stamp in his hastily acquired knowledge and technique; and finally spending a second week at the school for revision and further practical experience before sitting for his examination. Some such system would ensure a competent standard; but first-aid is unsatisfactory at present because it is badly taught, and our first step must be to ensure that the teachers learn how and what to teach.

MANAGEMENT OF SECONDARY SHOCK

CURRENT opinion on the treatment of wound shock is expressed in the Medical Research Council memorandum[3] which says that "the most important single requirement for arresting the progressive deterioration . . . is restoration of blood-volume." This opinion is justified by the experience of the Army Blood-transfusion Service with air-raid casualties. But the

1. The Training and Work of First-Aid Parties. H.M. Stationery Office, 6d.

2. *Publ. Hlth*, October, 1940, p. 5.

3. Treatment of Wound Shock: Instructions produced in coöperation with the Army Medical Service, M.R.C. War Memorandum No. 1. London, 1940.

impressive observations recorded on p. 99 by Colonel WHITBY and his associates in that service make it also clear that a low blood-volume cannot be restored by good intentions and a little fluid; the abolition of severe secondary shock often demands transfusion of almost unbelievably large amounts. In judging how much to give these workers have come to rely chiefly on the blood-pressure. They find that variation in the pulse-rate and the other clinical manifestations of secondary shock are fallacious guides, whereas recovery of blood-pressure runs parallel with recovery of blood-volume—a finding checked in some cases by the simple hæmatological method of blood-volume estimation first used by ROBERTSON and BOCK [4] and lately exploited by officers of the Army Blood-transfusion Service. The necessity for such an objective measure of the patient's needs arises partly from the possibility of giving too much rather than too little; for overloading of the circulation, with consequent pulmonary œdema, is a grave danger where large quantities of fluid are being pushed into veins. As things stand, however, cases of shock run a far greater risk of death from insufficiency than from excess. It is evident that transfusion can save cases that are otherwise hopeless; and in future no-one will be able to say that this remedy has failed unless the adequacy of the transfusion has been demonstrated by blood-pressure records.

In stating that transfusion can save lives we cannot pretend that the saving is wrought without much effort and planning in advance. The five pints of citrated plasma used in some of the Bristol cases to restore blood-volume before operation represent the contribution of fifteen voluntary donors, and no organisation short of the elaborate transfusion services that have now been established could hope to provide sufficient amounts of the appropriate fluid with the promptness essential for the successful treatment of those who are badly wounded. Secondly, even when the blood or plasma is readily at hand it cannot be used to full advantage unless there are good facilities. The vital work of resuscitation after injury demands that between the reception-room and the operating-theatre there shall be distinct and ample intermediate accommodation where an experienced officer is able to direct a generous allotment of skilled help. Here the more conservative measures for overcoming primary shock will be systematically applied, and may indeed prove sufficient except when casualties obviously need transfusion at once. An initial delay is useful for differentiation between primary and secondary shock, while the patient will be able to bear the burden of secondary shock better if he is no longer suffering from primary shock in addition. But if warmth, rest with the head low and smallish doses of morphia do not raise the systolic pressure above 100 mm. Hg within an hour, or if fifteen-minute readings show deterioration, transfusion will be wanted. When this decision has been taken and the transfusion has been given, and the blood-pressure and strength have risen enough to permit of operation, the patient may leave the resuscitation ward, but even now the need for watchfulness and action will by no means have passed. Blood-pressure that has been reasonably restored may fall again during the delay sometimes inevitable before the surgeon can get to work, or through the action of the anæsthetic, or as an effect of the operation itself. Apart from the possibility of renewed bleeding there is the certainty that the watery citrate solution used to prevent coagulation of the blood or plasma will be rapidly excreted from the circulation, and this fraction amounts to two-sevenths or more of the total volume administered. In view of this disposition to relapse the needle or cannula should not be removed from the vein and the patient should be accompanied to the operating-theatre by a slowly dripping bottle of blood whose transfusion can be accelerated at any moment if need arises. Ideally, a member of the resuscitation team, perhaps a senior medical student, should follow each patient from reception until operation is over. With a blood-pressure cuff in situ either this attendant or the anæsthetist can ensure that the patient reaches his final ward in good condition. As to the choice of resuscitation fluid, the reports of the Army Blood-transfusion Service establish the safety of citrated plasma, but their experience suggests that after every two pints of plasma it is best to introduce a pint of blood. Those who are accustomed to put their faith in dilute plasma mixtures or in normal saline should remember that the action of these solutions on blood-pressure is short lived.

Anyone who has treated air-raid casualties will appreciate the difficulty of collecting data as comprehensive as those presented in our columns this week. Amid the hubbub of the blitz the teams of the Army Blood-transfustion Service have managed to clear a metaphorical space for clinical research and have there given their minds coolly to the principles of treatment and the verification of those principles in practice. If these and similar studies can be pursued they should soon enable us to answer far more distinctly the vexed but fundamental question how far reduction in blood-volume is the basic cause of secondary shock and how far other factors contribute. The facts already obtained speak louder than words.

4. Robertson, O. H. and Bock, A. V. *Spec. Rep. Ser. med. Res. Coun. Lond.* No. 25, 1919, p. 226.

INFLUENZAS A AND B

SINCE the successful inoculation of ferrets with a virus obtained from epidemic influenza patients in 1933, most of the more widespread influenza outbreaks throughout the world have yielded a similar virus when it has been looked for. But there has been increasing evidence that, apart from sporadic cases and local outbreaks of clinical influenza, definite epidemics may occur in which this virus is absent or plays only a minor rôle. Workers at the National Institute for Medical Research and at the laboratories of the Rockefeller Foundation, New York, lately agreed [1] to call the original agent "influenza A virus," and to keep a sharp look-out for yet undiscovered viruses B, C, and so on, or other agents which might be responsible for those outbreaks from which A is absent. They have not had long to wait. FRANCIS [2] has described "a new type of virus from epidemic influenza" which is designated "influenza B virus." This turned up in throat washings from patients with influenza near New York in February and March, 1940, and evidence was obtained that it was also concerned

1. Horsfall, F. L. Jr., Lennette, E. H., Rickard, E. R., Andrewes, C. H., Smith, W. and Stuart-Harris, C. H. *Lancet*, 1940, **2**, 413.
2. Francis, T. Jun. *Science*, 1940, **92**, 405.

in epidemic influenza in the south-eastern states at about the same time.

Serological differences amongst influenza A viruses have been recorded by several workers but there is always an unmistakable antigenic overlap; virus B on the contrary is serologically quite unrelated to A. It seems to be biologically similar in that it will infect ferrets and mice, but both the primary transfer from man to ferret and the subsequent infection of mice from ferrets are more difficult than with A; only one strain of B has in fact been securely established in ferrets and mice. Sera from patients convalescent from outbreaks of influenza B have shown a specific rise in neutralising antibodies against B and not against A. Existing evidence as to the prevalence of B is based thus far on serological evidence of this sort rather than on actual isolation of the virus. FRANCIS deduces on this basis that an epidemic he studied in California in 1936 [3] was probably caused by influenza virus B; and it appears also that the same virus was concerned in an outbreak in the West Indies last summer.

This last finding raises a question of much epidemiological interest, for the West Indian outbreak was apparently due in the main to influenza A virus. This is not the first occasion on which different viruses have been isolated from one influenza outbreak. STUART-HARRIS and others [4] recovered several distinct serological strains of virus A from the epidemic in Britain of 1936–37, and similar findings are on record from North America and Australia. The 1939 outbreak in this country was only to a minor extent caused [5] by virus A; possibly B was the chief villain in that year. It will doubtless be diligently sought for in this country. Difficulties encountered in 1939 seemed to set back our hopes of finding a differentiation between epidemic influenza and "febrile catarrhs" which should have both a clinical and an ætiological basis. Now that influenza B is on the map we must recognise that the problem is even more complex than it looked a few years ago and must try not to lose patience with those who are trying to unravel the tangled skein.

ARTERIO-VENOUS ANEURYSM

WAR lends special interest to arterio-venous aneurysms, for most of them come from gunshot wounds. Two recent papers by observers who have disagreed before show that this condition is still imperfectly understood. Sir THOMAS LEWIS [6] reports observations on three men wounded in the last war. His paper is mainly concerned with the compensatory changes in the affected limb whereby its circulation is restored to normal or more than normal. Diminution in vasomotor tone is found but does not account for the whole increase in blood flow, which LEWIS is inclined to attribute to vascular growth in response to a local chemical stimulus. For the surgeon the point of immediate interest is that here are three cases all of some twenty years' standing without any cardiac breakdown resulting from the fistula. One of them LEWIS has reported before [7] and he estimated that the leak from artery to vein in this case amounted to half the cardiac output. It is true that these men are not free of symptoms but such as they have are not due to cardiac failure. Prof. EMILE HOLMAN,[8] reporting nine cases in addition to twelve previously reported, deals with the problem from a surgical point of view. He maintains that the risk of cardiac failure as a result of the fistula may be determined by the behaviour of the blood-pressure and pulse on digital occlusion of the fistula, and he maintains that in a recent case an increase of pulse-rate and a fall of blood-pressure even if small indicates a large fistula which is almost certain to overtax the heart sooner or later. He records two cases with heart-failure relieved by operation, both of which had had a fistula for several years before developing cardiac symptoms. Two of his other cases were of several years' duration without cardiac failure and the remainder were recent. LEWIS'S cases and some of HOLMAN'S show that it is not easy to foretell the effect of the fistula on the heart and the possibility of cardiac failure can hardly be regarded as an absolute indication for operation. With regard to the general effects of arterio-venous fistula HOLMAN says that the extent of the increase in blood-pressure and fall in pulse-rate produced by digital occlusion of the fistula is commensurate with the extent of dilatation of the heart and vessels proximal to the fistula, being least when the fistula is of short duration and greatest in cases of long duration with cardiac dilatation. In several cases he observed that the fistula was associated with an increased blood-volume which returned to normal after the fistula had been closed by operation. Immediately after operation the same rise of blood-pressure and fall in pulse-rate occurred but these returned to normal with the elimination of the surplus blood-volume. LEWIS and HOLMAN differ about venous pressure in these cases but they seem to agree that there is no rise in general venous pressure in the absence of cardiac failure. Eight of HOLMAN'S patients were treated by ligation or excision of parts of the main vessels of a limb but in none was there any impairment of the vitality of the peripheral tissues. In all cases there had been developed an adequate collateral circulation, and, as LEWIS'S observations show, in a long-standing case it is more than adequate. If surgery is decided on as soon as a diagnosis is made, time should be allowed for this collateral circulation to develop and in one of HOLMAN'S cases operation was deliberately delayed for this purpose.

Mrs. CRESWICK ATKINSON, a member of the Horder Committee and technical adviser to the Women's Voluntary Services, has been appointed to undertake social welfare work for women and children using air-raid shelters in London. She will confine her work to shelters holding 500 or more; the needs in smaller shelters are thought to be different. The appointment is a full-time one. Mrs. Atkinson will be assisted by a band of workers who will advise and guide the mothers in the new welfare problems created by shelter life. She will work with Alderman Charles Key, M.P., the London regional commissioner for shelters.

SINCE the publication of the last list of subscriptions to the Medical War Relief Fund £680 has been received, bringing the total to nearly £14,600.

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3. *Amer. J. publ. Hlth*, 1937, **27**, 211.
4. Stuart-Harris, Andrewes and Smith, *Spec. Rep. Ser. med. Res. Coun., Lond.* No. 228. 1938.
5. Stuart-Harris, Smith and Andrewes, *Lancet*, 1940, **1**, 205.
6. Lewis, T. *Clin. Sci.* 1940, **4**, 277.
7. Lewis and Drury, A. N. *Heart*, 1923, **10**, 301.
8. Holman, E. *Ann. Surg.* 1940, **112**, 840.

Annotations

RETIREMENT OF MR. R. H. CURTIS

AN outstanding figure in the public administration of this country has reached the end of his official life. Mr. Curtis, barrister-at-law, chief officer of the mental hospital departments of the London County Council, has just retired under the age-limit after giving service for 46 years, first under the Metropolitan Asylums Board, then under the Asylums Committee, and since 1916, when their functions were transferred to it, under the L.C.C. He will carry with him into retirement the good wishes and affection of all those who worked with him and whom he imbued with his own zeal. He read widely and could argue medical points about the latest views on the treatment and care of mental patients with a wealth of knowledge which was often disconcerting. He took a special interest in the pioneer work done at the Maudsley Hospital and in the research laboratories of his department. He was proud of the two university chairs established at the hospital and the support accorded to it by the Rockefeller Foundation. His official reports revealed his mastery of the English language and disclosed one of his hobbies which was the study of the meaning and derivation of words. During the long evenings his active brain will need some occupation, and we commend to his attention the writing of a history of the Maudsley Hospital to enlighten future historians about the origin of this remarkable experiment in mental treatment.

PSYCHOLOGY AIDING INDUSTRY

WHEN war broke out it seemed possible that the activities of the National Institute of Industrial Psychology might have to be suspended but its work has gone on with a certain difference of objective. The need of the moment is not so much the heightening of craftmanship as the development of repetitive production. As a peripatetic correspondent pointed out in October (p. 499), craft cannot be acquired by drill but team-work reinforced by motion-study and the discovery of the simplest and easiest way of getting results may become a very effective method of mass-production. The demand for vocational guidance has not disappeared and an increasing number of industrial firms are turning to the institute for advice; indeed, with a staff depleted by the claims of the fighting services the institute is finding difficulty in meeting all the requests for help which are reaching it. But for the most part the staff of the institute has been occupied in devising schemes for training operatives in engineering processes, electrical assembly work, power sewing machining and weaving; by introducing such schemes into industries they have shown that it is possible to shorten the normal period of instruction and ensure greater dexterity. The training school is also used to separate those who are capable of doing skilled work from those who will be more successful in routine processes. In one firm, where careful hand-soldering of seams is required in the manufacture of air-tight shell fuse cases, the weekly output at the start was only 1000 good cases and several thousand rejects; as skill improved an output of 10,000 good cases a week was achieved, and it seemed likely that this was the maximum to be hoped for. When a systematic training scheme was instituted, however, the rejects declined and the good cases rose to 20,000 a week. The institute has also been able to advise on hours of work, rest pauses, shifts, ventilation, lighting, light-traps, and the colour of interior paint. Help was given to the Joint War Organisation of the British Red Cross Society and the Order of St. John of Jerusalem at a depot where parcels were packed for prisoners of war. Simpler methods of packing and handling were advised, and improved equipment designed for a new depot. Work for education authorities has gone on; intelligence and performance tests have been devised, and new group tests for constructional abilities are being tried out in schools. A vocational guidance experiment at Birmingham by Mrs. E. P. Hunt and Mr. Percival Smith, with which the institute has been associated, shows that children who were given—and took—vocational advice were placed more advantageously in industry than those who did not follow the advice; and also more favourably than a control group who were given no advice.

"CEREBRAL INFLUENZA"

G. N. Pattison[1] has described 20 consecutive cases of what he calls cerebral influenza simulating early cerebrospinal meningitis arising in two nearby but entirely separate military units. The signs and symptoms were frontal headache, which was the most outstanding feature, sudden pyrexia with slow subsidence, malaise and general pains, an initial small petechial or scarlatiniform rash on head, neck and chest in 9 cases, photophobia in some cases, and neck rigidity slight in 6 men and definite in one who also had a positive Kernig's sign. One man was slightly delirious. Lumbar puncture seems to have been done in one case only, and this yielded a clear fluid, not under pressure and containing no organisms. No involvement of the throat, nose and chest was observed. The duration of the illness is not stated, but it was short and recovery uneventful. Only about a third of the patients had chemotherapy and these did not recover so rapidly as the others, who were treated with aspirin, quinine and Dover's powder.

It is a good thing to suspect cerebrospinal fever, and imperative to have a lumbar puncture done, in all febrile conditions which resemble it and are otherwise unexplained. Points against the diagnosis of cerebrospinal fever in Pattison's epidemic are the absence of vomiting, of irritability on being touched or moved, of drowsiness or prostration, of neck rigidity and Kernig's sign in the majority, the character of the rash, the clear cerebrospinal fluid and the recovery without special treatment. A scarlatiniform or *small* petechial rash on head, neck and chest does not suggest meningococcal so much as streptococcal activity. In meningococcal disease the rash may be macular or rose-red papular at onset, but scarlatiniform or minute petechial rashes must be very rare. When the petechiæ appear they are nearly always irregular in size, and seldom minute, and their distribution, unless very scanty, includes the flanks and upper thighs. A clear cerebrospinal fluid may, of course, be obtained in the septicæmic stage of the disease, but there is usually, though not always, a slight increase of cell content including polymorphs; and a few colonies of meningococci are sometimes grown from clear fluids with a normal cell count. Rapid recovery without serum treatment or chemotherapy occurs, too, in rare mild or abortive cases, but is unthinkable in 20 consecutive cases. A leucocyte count might also be of value. In pure influenza the tendency is to a leucopenia with relative lymphocytosis, whereas in cerebrospinal fever there is constantly a decided leucocytosis.

In the absence of further details it would be idle to speculate on the real nature of Pattison's cases. If they occurred on the Mediterranean littoral the diagnosis might be anything from sandfly fever to primary smallpox in well-vaccinated subjects. It might even, in the end, be necessary to relegate them to that highly popular category of the last war, P.U.O. If they occurred in France or in this country a streptococcal origin is not unlikely with a primary focus in a sinus or elsewhere in the upper respiratory tract. The rash would appear only in a minority of the men who happened to be Dick-positive reactors. A scarlatiniform rash easily becomes a minute petechial rash in sites of pressure, like Pastia's sign in the flexures of the elbows in scarlet fever. Slight neck rigidity is a subjective

1. *Jour. R. Army med. Cps*, 1940, 75, 388.

sign that is not always easy to differentiate from voluntary resistance to flexion. A diagnosis of "cerebral influenza" should never be other than provisional, pending a full clinical investigation which would necessarily include lumbar puncture, blood-counts, and possibly radiography of sinuses. It is doubtful indeed if this diagnosis is justifiable at all in the absence of a well-defined epidemic of influenza. There can be no ætiological proof and the diagnosis becomes purely speculative. It has been common in the past to refer somewhat loosely to nervous types of influenza arising in connexion with an epidemic. These are, however, more accurately described as cases in which nervous symptoms are prominent during or after the attack. If the term cerebral influenza is to be used, there should first be a reasonable probability of the influenza virus being active in the neighbourhood, and secondly, the symptoms should include distinctively cerebral manifestations—for example, upper neurone paresis, convulsions of Jacksonian type, or coma. Headache, delirium and occasional slight neck rigidity are common to many fevers and do not in themselves constitute a cerebral type.

ALCOHOLISM AND DRUG TOLERANCE

WE noted not long ago [1] that even the moderate drinker must remind himself as he drinks his glass of beer that it will play the devil with his leukotaxine and make him an easier prey for prowling bacteria. Chronic alcoholism has its own drawbacks. It is an old observation that the heavy drinker is difficult to anæsthetise, and that the anæsthetist can, by noting the amount of ether required to put him under, plumb the depth of his alcoholic past. Ahlquist and Dille [2] have been experimenting to find out whether tolerance to alcohol affects the response to other drugs, but since among the other traditional figures that hard times have banished are the two-bottle and three-bottle men they have had to fall back on artificially debauched rabbits. They produced tolerance to alcohol in these animals by injecting intraperitoneally 1·5 g. of alcohol per kg. body-weight daily in 20% solution for 15–25 days. This dose made the rabbits moderately intoxicated, on human standards. The first and last doses were given intravenously, and tolerance was considered satisfactory when the sleeping time after a dose was reduced to a half. Tolerance to other drugs was estimated 48 hours later, by which time the residual alcohol had been eliminated while the alcohol tolerance remained much the same. Five drugs were tested: two hypnotics, pentobarbital sodium (Nembutal) and hexobarbitone (Evipal); an anæsthetic, ether; an analgesic, amidopyrin; and a central stimulant (metrazol, leptazol or Cardiazol). The effect of the hypnotics was estimated by noting the sleeping time after a dose of 20 mg. per kg. body-weight; alcoholism reduced this from 31 to 18 min. for pentobarbital, and from 11·2 to 6·5 min. for hexobarbitone. For ether the amount needed to produce loss of the righting reflex was the criterion, and this rose from 0·87 c.cm. per kg. before alcoholism to 1·28 c.cm. afterwards. Analgesia was measured by determining the threshold faradic stimulus which would produce a sharp inspiration, and this was estimated before and after the administration of 100 mg. of amidopyrin per kg. body-weight, the rabbit reclining in a hammock the while. Here alcoholism made no difference whatever to the action of the drug. The reactions of the rabbits to intravenous leptazol were graded into five classes: 1, slight quickening of respirations; 2, twitching of the nose and eyelids; 3, a characteristic posture, with the back up, the forelegs stiff, the toes spread out and the tail raised; 4, violent convulsions; and 5, death. In about half of the animals 10 mg. of the drug produced either reaction 3 or 4, and the average response was the same before and after the acquisition of alcohol tolerance. It seems, then, that cross-tolerance extends from alcohol to other drugs depressing the central nervous system but no further.

1. *Lancet*, 1940, **2**, 811.
2. Ahlquist, R. P. and Dille, J. M. *J. Pharmacol.* 1940, **70**, 301.

CHARCOT-LEYDEN CRYSTALS

Curschmann's spirals and Charcot-Leyden crystals are known to everyone who has read about asthma and though the spirals are probably casts of the smaller bronchi the significance and nature of the crystals is as mysterious as when they were first described in 1853 by Charcot in the heart-blood and spleen of a man who died of leukæmia. Leyden saw them in asthmatic sputum twenty years later and since then they have been found in many conditions. Speculation as to their nature has been common; coagulation or crystallisation products of eosinophils, spermine and calcium are among the substances said to be implicated. It is certain, however, that these colourless, elongated, octahedral crystals are most evident in diseases which cause an increase in the blood eosinophils. Thompson and Paddock [1] have lately examined by wet-smear the blood of 100 patients admitted to medical wards and suffering from a variety of illnesses without once finding the crystals, even though in some instances the eosinophils were as high as 25%. Of 5 patients with bronchial asthma and an average eosinophilia of 8% none had crystals in the blood while one patient with chronic ulcerative colitis had typical crystals in the stools but none in the blood. On the other hand 2 out of 3 patients with chronic myelogenous leukæmia, one patient presumed to have periarteritis nodosa and another with trichiniasis all showed numbers of crystals in wet-smear preparations. Of 11 fatal cases of leukæmia, however, only one had crystals in the tissues; these were present throughout the body but were most plentiful in the spleen and pancreas. An attempt to induce crystal formation in guineapigs by inoculation with *Trichina spiralis*, which caused a 20% eosinophilia, failed. Thompson and Paddock are judiciously but regrettably silent about the nature of the crystals except that they are soluble in a variety of common chemical substances and that once destroyed they could not be reconstituted. So far, therefore, all we can say is that Charcot-Leyden crystals are most likely to be found in asthma, periarteritis nodosa, trichiniasis, in certain intestinal infections and in localised collections of eosinophils such as nasal polyps and skin blebs; the claims that they are present in prostatic secretions and in normal blood are probably false. The feature common to these conditions is a high absolute or local eosinophilia and the association seems proven. It is possible that the isolation and chemical analysis of the crystals would help in the understanding of the eosinophil.

DRUGS AND DRUGGISTS

ADDRESSING the Pharmaceutical Society on Jan. 16 Mr. Arthur Mortimer, secretary of the Wholesale Drug Trade Association, said that before the war started he had made a world survey of drugs in common use in Great Britain, with their countries of origin and alternative sources of supply. This he had done in view of the possibility of interference, through any cause, with the normal supply of drugs. The Association of British Chemical Manufacturers had also prepared lists of chemicals. These investigations were followed by a census of the stocks of materia medica which had proved useful to the authorities. The information thus made available was supplemented by an estimate of the volume of vegetable drugs and medicinal chemicals required by the health services, the Forces and the civil population in peace-time and an estimate of what might be required in time of war. This work was not undertaken merely on account of fear of war, but as a preliminary to ensuring the best use of resources and the encouragement of home trade. Stocks

1. Thompson, J. H., Paddock, F. K. *New Engl. J. Med.* 1940, **223**, 936.

in short supply were increased; fine chemicals which had not been made hitherto in this country were investigated and plant and working formulæ were devised. Mr. Mortimer referred to a number of crude drugs which are or may be in short supply, although, he added, "if care is exercised, and substitutes prescribed wherever possible, we shall have no difficulty in meeting the situation." Gentian, squill, liquorice, senega, cassia, belladonna, hyoscyamus, stramonium and colchicum should be available, in quantities sufficient to meet all ordinary needs, as a result of measures which had been taken to ensure supplies. Foreign-owned British patents had proved a serious handicap to British manufacturers, but medicinal products covered by these patents were now being produced in this country under licences granted by the comptroller of patents and presented under trade names other than those used by the foreign owners of the trade marks. "There is," he said, "no call upon us as Britons to perpetuate the goodwill in enemy trade names, and a strong appeal is being made that the official names should be used wherever possible in preference to proprietary names in scientific literature, by manufacturers and prescribers, and in the teaching hospitals and institutions." The reference was particularly to those synthetic products which are the subject of monographs in the third addendum to the B.P. and he added that the Government naturally expected that every pharmacist would refuse to help to keep enemy trade marks warm. Mr. Mortimer ended with an appeal to set up an advisory committee for the drug trade.

FRIEDLÄNDER PNEUMONIA

Friedländer's bacillus, a short thick gram-negative capsulated bacillus, has long enjoyed a reputation for causing a very severe form of pneumonia, and the tendency of older physicians to exaggerate the frequency of Friedländer pneumonia may be traced to Friedländer's early mistake in confusing his bacillus with the pneumococcus—which incidentally he, not Fränkel, first isolated from cases of pneumonia. Bacteriological studies in large series of pneumonias put the incidence of Friedländer infections at 0·5–1%, although occasionally higher and even epidemic incidence has been reported. While the onset resembles that of a pneumococcal lobar pneumonia, certain clinical features help to distinguish Friedländer pneumonia which attacks mostly men in the older age-groups. Hæmoptysis may be an initial sign, and the sputum is characteristically gelatinous and tenacious, and often brick-red in contrast to the rusty spit of the pneumococcal infection. Temperature is not high as a rule, the patient quickly becomes very ill, and the physical signs of a pneumonia, particularly crepitations and bronchial breathing, are often absent. There may be leucopenia or only slight leucocytosis. The diagnosis is made by bacteriological examination of the sputum. A gram-stained smear shows many typical gram-negative bacilli with a negative halo representing the capsule; mouse-inoculation gives a pure culture of the Friedländer bacillus. The fatality-rate of this acute and usually rapidly fatal infection is 70–90%. Besides this fulminating pneumonia a more chronic form occurs either as a sequel to the acute disease or ushered in by an acute phase, and Solomon[1] has lately recorded the clinical features in 17 cases of which only 4 died. One of the commonest complications of the acute disease is a non-putrid necrosis of the lung; the resulting cavitation, usually in the upper lobes, is the outstanding feature of the chronic infection, and has led in a proportion of cases to a diagnosis of chronic pulmonary tuberculosis. The sputum is sometimes blood-stained, but more often is rather copious, purulent and brownish-yellow, but not foul-smelling unless secondary infection occurs. The diagnosis is again confirmed by bacteriological examination of the sputum from which Friedländer's bacillus can be isolated though it may be in mixed culture; the same organism may, of course, be present in sputum apart from a pneumonic infection, as it is often associated with chronic sinusitis. Lung abscess is the most common complication of chronic Friedländer pneumonia and is sometimes accompanied by an encapsuled empyema. Pleural effusion, pulmonary fibrosis and delayed resolution are other complications. Treatment is mostly symptomatic, although Solomon on the basis of 4 treated cases thinks that sulphapyridine is likely to be useful in tiding the patient over the acute phase of the infection though not in preventing complications. He advises against surgical drainage of lung abscess, for this drains adequately through the bronchus. This chronic disease may last with intermittent pyrexia for months and even years.

1. Solomon, S. *J. Amer. med. Ass.* 1940, **115**, 1527.

TRANSPLANTED CHILDREN

WE are between the devil and the deep sea when we try to spare children the strain of war. To see children taken underground at six in the evening in a large city and kept there, exposed to infection, cramped for space to play, breathing fœtid air, disturbed by the pressure of adult life around them, is to appreciate fully the value of evacuation. To conduct a child-guidance clinic in a reception area is, it seems, to see the other side of the penny. Speakers at the Tavistock Clinic (p. 121) tell that some children carry into the country the fear provoked by bombing, some break down as a result of their uprooting, some because they are placed in uncongenial homes and some from guilt at leaving their parents behind in danger. The position is not a simple one: there is evidently no clear right or wrong about evacuation and we must try to consider what is best for the greatest number. It is probably out of the question, in large schemes, to consider each case on its merits. Miss W. T. Alcock working in an eastern rural reception area speaks of the impact of "15,000 city-bred evacuees" on foster-mothers, and the repercussions on the children, among whom 420 cases of breakdown had occurred. This gives an incidence of 2·8%, and it would be interesting to know how this compares with the incidence of breakdown among town children in times of peace. Many speakers testified to the fact that children stand up to the strain of actual bombing well; Dr. R. P. Garrow found that during 16 months in a population of 12,000–15,000 children in a heavily bombed area none had been alleged to suffer from strain, and this may well have given an accurate picture of the situation. But we must not lose sight of the fact that however well adapted a child may be to stand up to the strain of bombing, he is totally unadapted to stand up to a bomb. During December 521 children were killed in air-raids, and it is fair to assume that most of these deaths occurred in towns. If those children had gone to the reception areas, at least 500 of them would be alive to-day; and of those about 15 would have broken down from emotional strain. Even the unlucky ones might have preferred the rôle of live dog to that of dead lion. It must be remembered, too, that a proportion of the evacuated children referred to child-guidance clinics would probably have shown symptoms at home in times of peace; and that among the large numbers of children who have settled down reasonably well there are probably some who have benefited emotionally by evacuation and have thus been spared a breakdown. The gain to children in physical health as a result of country life is reported on all sides and is not lightly to be discounted. This is not to pretend that children do not suffer from transplanting, or that they do not experience emotional stress as a result of separation from their parents. But the evidence suggests that by far the greater number of them adapt themselves to the new life, that they profit physically and that they are exposed to less direct risk of death. The position is not ideal, it has its own dangers, but for the moment it is probably the best we can do.

Special Articles

FAMILY BUDGETS BY THE THOUSAND

THOSE interested in the nutrition of different sections of the population are used to collecting and studying material on what the people eat from a few score families. And they do it very intensively, with trained workers to weigh all the foodstuffs consumed by a household in a week, to measure the amount wasted, necessarily or unnecessarily, and, in fact, to make quite sure that what the housewife says fits in with exact observation. Not many households can be investigated in this detail or, indeed, would be likely to submit to the necessary regimentation. To increase the field of observation a broader approach must be adopted, and "what the soldier said" must be accepted, in this case, as evidence. In other words, the housewife must agree to keep an account of all her family's expenditure in a given week and to keep it as accurately as possible. This was the method adopted by the Ministry of Labour in its inquiry undertaken in 1937–38 into the customary expenditure of working-class households in Great Britain and Northern Ireland, a preliminary account of which has just been published.[1]

The main purpose of the inquiry was the provision of data for a revision of the cost-of-living index figures, which are still based upon the way in which the average family spent its income on different items in 1914. Considerable changes in modes of living and in the distribution of expenditure have obviously taken place since then, and the relative importance of the different items in the family budget, e.g. types of food, rent, fuel, clothing, etc., was in urgent need of a re-assessment. The information collected is, however, of much interest to many who are not perfectly at home with the construction of index numbers and not particularly interested in the finished product. It gives a general picture of the standard of living prevailing in this country in the pre-war days and of what the people chose to eat in the more lowly-paid majority of our population—not as exact a picture, perhaps, as the nutritional worker demands in terms of calories, protein, minerals and vitamins, but a very valuable picture nevertheless.

The present report shows the average amounts spent on different articles in 8905 families in each of which the head was engaged in an industrial, commercial or clerical occupation. Each budget relates to 4 separate weeks spread over the year, to allow for seasonal variations (a rather larger amount of data is also given for each of the 4 weeks, including families which supplied records for 1 or more weeks but not for all four). In their geographical distribution they are representative of the country as a whole, but naturally they may be composed of families with housewives more capable than the average, for filling in forms is not everybody's strong point. Certainly an average weekly expenditure of £4 5*s.* per family seems surprisingly high in spite of the fact that the average composition of the families was only 3·77 persons, of whom 1·75, or nearly half, were wage or salary earners and only one was a child of under 14; 80 per cent. rented their houses and made an average weekly payment for rent, rates and water of 10*s.* 8*d.*; 18 per cent. owned or were buying their dwellings and had corresponding charges of 12*s.* 9*d.*; 2 per cent., mainly coalminers, lived rent free. In total the average cost of housing these industrial families was 10*s.* 10*d.* or nearly 13 per cent. of their total weekly expenditure of £4 5*s.* (the actual amount was £4 6*s.* 3*d.*, but a slight adjustment has been made for expenditure on clothing which appeared to be overstated). To clothing was allotted a weekly average of 8*s.* 1*d.*, or between 9 and 10 per cent. of the total, to fuel and lighting 6*s.* 5*d.*, or 7 to 8 per cent., to food 34*s.* 1*d.*, or approximately 40 per cent., and to other items 25*s.* 7*d.*, or about 30 per cent. No attempt, it may be noted, was made to obtain the actual incomes received, for such might well have led to a lack of coöperation.

The proportion of expenditure devoted to food is considerably less than that shown in earlier studies, when it has been nearer 60 per cent. The smaller the income the more, of course, has to be allotted to food and with rising wage standards and less mouths to feed the more there is to be transferred to the large group of "other items."

These include cleaning materials 1*s.* 1½*d.* a week, household goods and utensils 1*s.* 3½*d.*, furniture and carpets 1*s.* 8½*d.*, tobacco and cigarettes 2*s.* 6½*d.*, travelling 2*s.* 3*d.*, newspapers, magazines and periodicals 1*s.*, books and stationery only 2½*d.*, postages 5*d.*, cinemas 10½*d.*, other entertainments 5½*d.*, education 3½*d.*, hairdressing and shaving 6½*d.*, doctor, dentist, midwife and the like 10½*d.*, medicines, etc. 6*d.*, insurance contributions (state and private) 4*s.* 5½*d.*, trade-union subscriptions 1*s.* 4½*d.*, holidays 7½*d.*, beer, mineral waters, &c. 9½*d.* (but possibly the average housewife has not full cognisance of this item). The contrasts speak for themselves and need no comment. The distribution of the 34*s.* 1*d.* on food is also of much interest, and shows, with one or two exceptions, extremely little variability from one season of the year to another. 3*s.* 6½*d.*, or roughly 11 per cent., goes to bread and flour and as much as 1*s.* 6½*d.* to cakes, buns, pastries, biscuits, etc. On the other hand, oatmeal, rice, sago, tapioca, barley, macaroni, and breakfast cereals call for only 3½*d.*; there is clearly plenty of scope for response to the Minister of Food's appeal for a greater use of the first-named article. Meat (beef, veal, mutton, lamb and pork) calls for 4*s.* 8½*d.*, a seventh of the food expenditure, and to this must be added 1*s.* 6*d.* on rabbits, poultry, sausages, &c., and 1*s.* 11*d.* on bacon, ham and gammon, a total of approximately 8*s.* or nearly a quarter of the food expenditure on meat or meat products. Fish of all kinds, on the other hand, amounts to only 1*s.* 4½*d.* Fresh milk costs 3*s.* 0½*d.*, giving the average family about ½ pint per head per day.

In these happier days of peace margarine was in no great demand, for an average expenditure of 4½*d.* per week sufficed against 2*s.* 5½*d.* for butter. Tea at 1*s.* 7½*d.* a week is a fairly heavy item and this average family consumes 1½ lb. of sugar per head per week at a household cost of 1*s.* 0½*d.* and rather more than 3½ lb. of potatoes per head at a cost of 1*s.* 1½*d.* Other vegetables cost 1*s.* 4½*d.*, apples, oranges and bananas 11½*d.*, other fruit (fresh, dried and canned) 10½*d.*, and eggs 1*s.* 10½*d.*

The precepts of the nutritional experts would suggest too great an attraction to meat, sugar, cakes and buns, too little to green vegetables, cheese and milk puddings. Even within the limits of expenditure possible the average diet could doubtless be improved. The average, however, conceals as much as it tells. How much variation is there between the diets of the population in different parts of the country, how do they compare between one level of expenditure and another, and how between the urban and rural worker? The answers to these and many other questions the Ministry of Labour will be able to supply in time from the results of its large-scale inquiry. Further instalments of this excellent serial will be looked for eagerly.

1. *Ministry of Labour Gazette*, December, 1940. H.M. Stat. Office, 6*d.*

MEDICINE AND THE LAW

Uncertainties of a Charitable Bequest

BECAUSE the law does not allow a bequest for "charitable or benevolent" objects to be a valid charitable bequest, some 140 institutions of a charitable nature may have to hand back sums amounting in all to more than a quarter of a million pounds. In many cases the money has been spent and no funds are available for replacing it. We have been taught to revere the certainty of the law and to admire the principle of judicial consistency. We have understood that the law exists in order to protect acquired rights. Unfortunately the whole law of charities is full of uncertainty, and, it now appears, institutions which have in good faith received money which the donor intended them to receive must attempt what may be the impossible task of repayment. Guy's Hospital was given £20,000 with a request that it be specially used for a children's ward. The Westminster Hospital was given £4000 which, it is understood, has been spent to excellent purpose. The Royal National Orthopædic Hospital was given £5000 which was devoted to building a swimming-pool for the treatment of paralysis. The diocesan board of Chichester received £2000. These benefits cannot be handed back in the form into which the money has been converted. If the cash must be found, whence is it to come?

When Mr. Caleb Diplock died in 1936, his executors found themselves with some £263,000 to dispose of to such charitable institutions or other "charitable or benevolent" objects in England as in their discretion they might select. That word "or," it seems, is fatal. Bequests for purposes which are described as "charitable or benevolent," "charitable or public," and "charitable or religious" have at various times been held not to be valid charitable gifts because of the difference between charity and benevolence and because of the indefiniteness which "or" introduces. In the Diplock case Mr. Justice Farwell managed to uphold the executors' distribution. The overriding intention of Mr. Diplock, he said, was to benefit objects which were charitable in the strict legal sense; the addition of "or benevolent" was not enough to control that overriding intention. The Master of the Rolls felt that the meaning of "or" must be disjunctive; it was no good pretending that it meant "and" or "*id est*." The Attorney-General, who appears in cases about charities in order to protect the public interest, sided with the executors and argued that "benevolent" had nowadays become really co-extensive with "charitable." The Master of the Rolls rejected the suggestion. The court spent hours examining the nature of a charity—a question largely dependent upon the preamble to a statute of 1601, the only part of the statute which survives. Many previous decisions were examined. A bequest for distributing the egregious works of the fanatical Joanna Southcott has been held valid; so has a bequest to encourage rifle-shooting, although a bequest to encourage cricket or football is not. Is it not really time that the law of charities was simplified and modernised? Apparently in drafting the Diplock will a precedent was copied from a well-known textbook for conveyancers. Somehow "or" was written in mistake for "and." Mr. Diplock was not anxious about the exact words; all he wanted was that the residue of his estate should be devoted to the charitable objects to which it has in fact been applied. Instead of that, the Court of Appeal declares this part of his will to be invalid, and the residue must devolve as if he had died intestate. And thus, as counsel remarked, the money goes to a second cousin in Australia whom the testator had never even seen. The Master of the Rolls fortifies himself with the reflection that the court must not be tempted to diverge from the strict path of legal dogma by any consideration of the consequences of its decision.

Meanwhile what are the hospitals and other bodies to do? Lord Justice Goddard suggested that this was a case for a private act. There are plenty of precedents for private legislation to cure difficulties arising out of trusts and family settlements. But this kind of retrospective intervention with rights of property is as unsatisfactory if effected by Parliament as when it is effected by judges. Leave has been given in the Diplock case to appeal to the House of Lords. But the bodies which in good faith accepted donations from the estate have now probably had enough of the law-courts for the present.

FIRST-AID TEACHING

PROPOSAL FOR A TRAINING SCHOOL IN BIRMINGHAM

THE Joint Committee of the British Red Cross Society and the St. John Ambulance Brigade in Birmingham believe that in the interests of first-aid training a civilian school on a national basis should be instituted. In March, 1940, they appointed a subcommittee "to investigate and report upon the present methods of training first-aid workers"—a committee with a distinguished personnel including professors, physicians, surgeons and experts on first-aid training. These agreed on the important principle that the rank and file of the first-aid services have often been taught too much, and that the aim should be to make teaching simpler but more thorough. On the basis of the subcommittee's report the joint committee has drawn up a scheme for a civilian first-aid training school to be established in Birmingham. The plan is suspended at present, because the central Red Cross and St. John authorities in London would not give it their sanction, but it is a step in the right direction that the Queen's Hospital, shortly to become the Birmingham Accident Hospital, is to undertake the training of industrial workers in first-aid.

The school would be intended primarily for laymen, and its certificate would ensure that the holder possessed specialised training in the subject and that he would be capable of imparting his knowledge to others. A body of lay instructors would thus be created who would be capable of improving the general standard of first-aid training throughout the country. Those holding the certificate of the school would be invaluable to the commandants of British Red Cross and St. John Ambulance detachments. A.R.P. authorities would welcome trained first-aid teachers and so would the police and fire brigades; school teachers could be offered a course suitable to their needs in training children; nurses, few of whom are taught first-aid at present, would find the course useful, and the scheme has the support of the Royal College of Nursing. Industries, to comply with the Factories Act, must have a person "trained in first-aid" in charge of the first-aid arrangements, and the school would be able to provide courses suited to the special requirements and hazards of industry. Doctors and medical students might also derive advantage from studying the methods and scope of first-aid teaching at the school.

Particular attention would be given to practical instruction, the planning of tactical exercises, and—since the main function of the school would be to produce instructors—to teaching methods. The coöperation of hospital and university staffs would enable students to gain authentic practical experience in casualty departments, operating theatres and at post-mortem examinations. Lack of such opportunities is one of the chief drawbacks of first-aid as taught at present. A real broken limb bears little relation to the obliging pantomime of a partner taking his turn at being the patient. Some industrial employers are willing, moreover, to open their ambulance-rooms and treatment stations for teaching purposes.

Courses.—The usual course would last a fortnight, following the successful practice at the Government A.R.P. school at Falfield. Students would be required to live in and certificates would be awarded on the results of an examination at the end of the course. A part-time course of a minimum of 80 hours' work, to be held on evenings and at week-ends, would be arranged for those unable to give their full time to the work. Special courses would be arranged for industrial students and nurses, and refresher courses would be held, annually or biennially, lasting one or two days.

The school would be under the charge of a commandant who would be a medical officer with experience of teaching methods and there would be whole-time lay instructors to assist with practical training; lectures and demonstrations would also be given by medical practitioners with special knowledge of different aspects of the subject. For example, anatomy and physiology would be taught by a member of the university teaching staff, and first-aid in industrial poisoning by doctors with special experience of industry. The better informed the instructor the more clearly he can distinguish what is, and what is not, essential knowledge for the student. As the subcommittee pointed out, the focus of first-aid as taught today is the treatment of fractures and the accompanying splints and bandages. But patients die, not from fractures, but from hæmorrhage, shock or asphyxia. The best first-aid treatment is to leave a fracture alone or at all events to subject it to the minimum of manipulation. The instructor must know all about splints, the more the better; but he must use his knowledge to explain their limitations in first-aid treatment. Successful first-aid depends upon knowledge of what to leave alone.

The school would be under the joint jurisdiction of the British Red Cross Society and the St. John Ambulance Brigade in Birmingham, and governed by a board drawn from these two bodies, from the Ministry of Health, the medical faculty of Birmingham University, the British Medical Association, and from industry. Candidates would be admitted on the recommendations of local authorities, industrial bodies, and the Red Cross and St. John organisations. There would probably be an inclusive fee of £8 for the full course of 14 days, with board, lodging, tuition and examination, and a fee of £4 for the part-time non-resident course of 80 hours.

WAR STRAIN IN CHILDREN

A DEBATE AT THE TAVISTOCK CLINIC

CONTINUING the Sunday afternoon discussions (*Lancet*, 1940, **2**, 818) at a meeting on Jan. 12, Dr. W. J. T. KIMBER being in the chair, Miss A. T. ALCOCK (play therapist) opened with the remark that after the last war children grew up under strain, with resulting catastrophe. This war added to war strain the problem of separation from home and from the protection of its authority, and the threat to mental health was a serious one. She worked in an eastern rural reception area, and all cases of difficult behaviour were referred to her department. The impact of 15,000 city-bred evacuees had produced emotional disturbances among foster-mothers, which had often precipitated breakdown in children rendered susceptible by their own prolonged psychic strain. The chief precipitating factors were uprooting from home, insecurity of the new environment, transferred adult strain and direct air-raid experience. Symptoms produced by bombing were easy to clear up; those due to separation were much more difficult. Four hundred and twenty cases of breakdown had occurred: 249 boys and 171 girls; 89% attended elementary schools and most of them were between 7½ and 11½ years old. This was rather surprising, as emotional tension was supposed to be at its lowest at that age. Nearly all were unaccompanied by the mother. The psychosomatic group contained 129 cases—more than a third of the whole. Psychoneurotic and behaviour disorders represented a quarter each of the total, and educational difficulties one-sixth. The first group included enuresis, incontinence, hysterical vomiting, somnambulism, fits and tics. In the early days children had been referred to the centre according to their nuisance value, and enuresis had topped the list. Later, however, foster-mothers and local authorities became more sympathetic, and the effects of prolonged strain combined with this to make psychoneurotic cases the most numerous. The anxiety-depression figure was now the highest of all.

About 100 cases of enuresis had been sent up, and some 500 more had been dealt with in the foster homes. Belladonna had seldom been successful, but many responded to simple suggestion, relieving immediate anxiety and encouraging the child to believe that he would manage to control his sphincter. The fear of loss of control was so fundamental that it had seemed worth while to focus suggestion on that point. Glucose had been helpful. Separation from the mother had clearly been a factor, and foster-mothers who showed maternal tenderness were often successful where skill and cold kindness failed. A nursery school had been notoriously "wet" for a year under three successive matrons, but under a fourth, who was much more maternal, it had "gone dry" in three months. The astonishing thing about enuresis was the measures that cured it; one foster-mother had cured it "with one look" and another by taking the child to the pigsty and saying, "Look at the old sow, now; she's clean, she is; she wouldn't wet 'er straw, she wouldn't, and no more must you!" The resentment and anger of foster-parents put a great strain on the child. Many child-guidance workers had wrongly laid emphasis on the child's inability to help wetting the bed, without laying equal stress on the help that would be given to him. Often a child would say with stolid helplessness, "Doctor says I can't help it." In some cases laziness did play a part. A child had been overheard to say to a companion, "It's horrid cold to get out—and they say I can't help it."

There had been twelve cases of fæcal incontinence, which seemed associated with a harsh foster-parent. The psychoneurotic group included 39 anxiety cases, 40 depressions, 4 of general nervousness, 2 hysterics and 2 obsessionals. Sometimes the symptoms, on arrival from a bombed area, were really acute for a few days. One child had presented the complete picture of an adult depressive psychosis for nearly seven weeks; she had been a lively, happy child at home. One obsessional girl had compulsively hidden her clothes at night, with amnesia in the morning; her phantasy had been of a baby her mother was supposed to be producing at home. She had been helped by encouraging her to mother the foster-mother's baby.

Treatment had been mostly environmental, directed to increasing tolerance and understanding in the foster-mother and to getting the child interested in local activity. Direct treatment had been to try and release emotional strain and get the child to talk about parents and family. There was often guilt at leaving the parent. Very few sedatives had been given; bromides had proved depressing, but allonal had been useful. Children for whom physical danger had been the chief strain seemed to react by difficult behaviour, whereas those who suffered more from separation seemed to react with psychosomatic or psychoneurotic disorders. Behaviour troubles had been dealt with by providing suitable activities. Not more than one in fifty of the children had been in the same billet throughout the war, and the varying social standards and the divided loyalty between home and foster-parents made life very difficult for the children. School classes were composed of children who did not know each other or the teacher. Some children seemed to be ineducable, though not defective: they were quite unable to concentrate, with special trouble in auditory association.

In face of constant difficulty and danger there seemed to be a tendency to regress to an earlier stage of development. The strain could not be prevented but it could be countered and, if tackled in the early stages, could be cleared up without difficulty. Unfortunately public opinion was not adequately alive to the urgent national necessity of safeguarding the mental health of the children on whom would fall the burden of building the brave new world. If the result of this neglect proved to be deficiency or neurosis on a large scale, we should win the war only to lose it at home.

The CHAIRMAN said he had been struck by the effect on children of the threat to the parents left behind and the feeling of guilt in having "run away." It was vague, but very real, even in tiny children, and produced continuous anxiety. Children were much less affected by bombing than had been anticipated. He thought that perhaps the type of child who reacted psychoneurotically made good at first, and only broke down later; and that this might partly explain their rarity at the clinic in the early months. Was the lack of control in the enuretic child a retort to the lack of control in the home and nation? He thought that more than one in fifty of the children in his area stayed in the same billet. The feeling of isolation was a very important and inadequately recognised problem; to find them some constructive job was most valuable.

Dr. EVELYN LUCAS mentioned the enormous numbers of children suffering from neurotic manifestations during what was usually regarded as the "latency" period. It made her wonder whether children during this period at home did more than develop an adaptation due to repression, and so not adequate to deal with upheavals. The incidence of enuresis in Miss Alcock's area seemed to be small in proportion to the total number of evacuees. She agreed that it was important not to over-emphasise the child's inability to help it. One inveterate bed-wetter aged five had been brought up by very gentle, loving parents with whom she had an excellent relationship. One day the mother said, "Well, really, I don't know what to do." "Well," replied the child, "all I can see is that you'll have to be firm with me!" It had then been mutually agreed that she should be smacked every morning after a wetting, and she had been completely cured in a fortnight. The majority of children who were neurotic were children whose consciences were plaguing them. The children she herself had seen in London had not shown the slightest sign of neurotic reaction to bombing; like adults, the more neurotic they had been before the less they were affected. It was not the external reality that affected them, but the fear of the revengeful attacks on the parents which they had secretly so often wished. War was a peg to hang neurosis on. There were undoubtedly children who did very well physically in their evacuation areas, but there were also many who were suffering severely from the mental strain imposed on them, and it was important to ask what could be done to help them.

Miss ALCOCK replied that the latency period was one when much was asked of children; the children in infant school were really babies, and when they moved up they had to be boys and girls. Also, there were likely to be babies growing up at home, and these often stayed with the mother while the 8-year-old was evacuated. The first need was for someone to make contact with local authorities and to "spot" these cases in the schools. Direct psychiatric help was badly needed. Regular play centres were required, so that sources of help were available. The absorption of the children into local activities was of the utmost importance. London school-children in the country showed a very much higher immunity to colds and influenza than country children, but were very susceptible to skin diseases, showing an even higher incidence than in London; perhaps there was a psychogenic factor in this.

Mrs. HAMLIN (social worker at the clinic) said that the children had stood up to the war situation very well; the cases were similar to pre-war ones and the history always went back before the war—with the exception of one somnambulist. The absence of the father or brother on war service had been an aggravating factor. Enuresis had been the chief problem, and there had been a number of general delinquency cases of the truancy type—due to lack of educational and amusement facilities. Old patients, followed up after pre-war treatment, had improved remarkably since the war began. On the other hand, a certain number of adolescents had not shown this improvement.

Dr. LINA POTTER said that in the tube station to which she was medical officer, the children were not in the least afraid and were in excellent health. Dr. D. W. WINNICOTT thought that enuresis was often a valuable test to the child: "Am I loved when I'm naughty?" In his experience there was a relationship between incontinence and truancy. Melanie Klein only permitted her pupils to do "latency" cases after they had worked with younger children and adolescents; she found latency a very delicate and difficult state. Being at war was one thing and had an effect quite different from being in an air-raid, and that again was quite different from being bombed, being hurt and so on; and each aspect picked out a different type of child.

Dr. R. P. GARROW said that the evacuated child was certainly worse off than the child left in London. Medical officers of health had just received a regulation requiring medical examination of children thought to be suffering or likely to suffer in mind or body from remaining in the evacuation area. In an indiscriminately bombed area to which he referred, hundreds of children had been exposed to bombs and had come through with no apparent sign of reaction. During sixteen months, in a population of 12 to 15 thousand children, no child had been alleged to be suffering from such strain. No-one but parents or teacher would report such a child, and if the parents reported it there would be no call for the "compulsory evacuation" envisaged by the order. He would like help in interpreting the phrases "suffering in mind or body" and "in a state of health such that it is likely to suffer."

Dr. LUCAS asked if the order could be applied so that children might be sent back to London from the evacuation areas because they were suffering in mind through evacuation.

Colonel J. R. REES thought rough compulsory methods might work with adult enuretics but not with children. Success was claimed in Northern Ireland by telling patients to go to bed saying over to themselves, "My bladder is getting larger and larger and larger and larger." Would these children be better in London? in special schools? in camps? with their own teachers? In the army there was infinitely more neurosis than among the civil population; the civilians had responsibility and a job; the good soldier was an obedient child and gave up all his individuality. Should the children all be occupied in something of national importance? Would that in the long run be the surest way of avoiding neurotic trouble?

Miss G. E. CHESTERS (play therapist) suggested that play groups should be organised in reception areas. The staff of day nurseries was apt to diminish for various reasons, and the numbers should be carefully watched. Miss ALCOCK thought that country life provided adequate material to give children a play outlet.

In England Now

A Running Commentary by Peripatetic Correspondents

MY friend the shelter nurse took me through the snowy East-end streets to the riverside. House after house showed empty gaping windows, beams fallen awry, doors swinging loose or barred; here and there a little shop was still selling papers or a few sweets, and proclaiming against the evidence "Business as usual." She said that this street went on such a night, and that was where one fell, but nobody was killed—lucky, wasn't it?—and led me in through a broken doorway to show me the little house she had got her eye on for after the war, a shell now, but I could see it clothing itself before her mind's eye. In the end we came to her shelter under a wharf and down we went. The air struck warm and stuffy in the doorway, partly with the human smell which takes a bit of getting used to, and partly with the dry hairy smell of Government canvas nailed to bunks. The nurse was greeted on all sides; it was before six o'clock but people were settling in, and there were children everywhere. "Sickening, it is," she said, "they ought to be evacuated. We had hardly any when Malcolm came" (she was speaking of an official tour of inspection) "but a week after I couldn't make out where they were all coming from. Then I realised; Christmas, of course. They'd got them home for Christmas and they haven't sent them back." We threaded our way through the three-decker bunks round which the children were playing tag. The parents were laying out bedding, gossiping or sitting down to knit. They were cheerful enough and took it all as a matter of course. Surely man is the most easily conditioned animal of any? The medical-aid post was tucked away in a corner, a tiny room separated into two by a partition. The outer part held two narrow beds already made up—"our clean sheets," said the nurse with pride—a wire-netting stretcher, a table and a row of chairs. "We have gargling," the nurse said, "for the children; then I can keep my eye on them. And I get the P.S.U. to show them how." "P.S.U.?" "Pacifist Service Unit; they do an awful lot for us. Here's one of them." He came out of the inner sanctum, looking about eighteen, but really twenty-two, and turned to at once as courier and lieutenant.

I saw a lot of the P.S.U. in the course of the evening and thought them more impressive than most things to be seen about today. The unit I visited lives in a Stepney flat; there are ten young men, and two sisters who cook for them. They undertake every kind of useful job in the district—cleansing shelters, emptying latrines, removing furniture free of cost for those who are bombed out, and carrying round cocoa and doughnuts to the shelters at night—rather guiltily because they think it ought to be vegetable soup and raw carrots. They spend a great deal of their time fixing up things for people who are puzzled—arranging matters with evacuation authorities, putting in claims to the right funds for railway fares or other allowances, and helping the rigid wheels of local government to follow, in the main, the right tracks. They appeared to find the whole affair rather entertaining, grinned about being sick the first time they "did latting," argued about world and local affairs throughout their meals (accompanied by Mozart on the gramophone) and rushed off immediately afterwards on the next job. They appeared to think nothing of the blitz, but mentioned the snowballing of the youth of Stepney with respect. Occasionally a citizen in a shelter takes one of them aside. "I hope you won't take offence at what I'm going to ask, Alec," he begins—or Gordon, or Charles, or whoever it may be—"but is it true that some of them chaps down at your unit is conchies?" When told, yes, quite a lot of them, the citizen is nonplussed; his experience of the work of the unit strikes at his preconceived notions, so he shakes his head a bit and gives it up.

I was taken to dinner at the unit almost immediately after arriving at the shelter, and then went out on a cocoa round. We picked up the cocoa at a place called "Paddy's Goose," a social club with a canteen, and went first to one of the archway shelters. A railway being

always a military objective the advantages of taking cover under it are not striking; but the arches were convenient to brick in and local authorities decided to use them. Condensation, and water draining from the lines, used to trickle on the shelterers, but this has been overcome in some by building a wooden penthouse roof inside the arch with wood taken from demolished houses. The wood is old, knot-holed and worn, and any bed bug who has been bombed out would find in it a wide choice of convenient well-built residences; those who have been there from the start are presumably at home and waiting to be shifted. The P.S.U. offered to creosote the whole interior, but though the local body approached agreed that that was the proper thing to do the final message which came back was that the Government wouldn't hear of it; this ruling, though fantastically improbable, holds good and the authorities have compromised, in the arch I visited, by painting half the roof and parts of the posts which support it with cream paint. The posts are destined to take bunks in due course, which unlike the bunks in most shelters will thus be fixed. In view of this a suggestion was made that the lowest bunk should be rather higher than the regulation nine inches off the floor, in order to make it easier to clean beneath it. No, the reply came back, the Government wouldn't hear of it. If there was any reason to suppose the Government was as sot in its ways as this the outlook would be black. The hitch is doubtless somewhere else in the machinery. The lighting in this shelter was good, there were two pianos, and the people had made the floor into a vast and comfortable bedroom. The bedding was spread on boards and boxes. There were only half a dozen deck chairs in use. Some of the children—there were fewer here than in the first shelter—were tucked up already. Others were playing an alarming game of getting the baby to jump off the piano into the arms of a slightly larger brother. Cocoa went round. Then three anxious-looking young men came in, from the Friends Ambulance Unit, to show a film. They conferred with the shelter marshal and with each other, they chose a bit of wall, they ran up a silver screen about five foot by six in area, they shone a beam upon it: and instantly crocodiles and snapping dogs appeared from busy juvenile fingers placed before the lens. There was a little more fidgeting and winding and then we found ourselves watching "Rome Express," and hearing the voices of the actors booming unfamiliarly in the hollows of the arch. We moved on and visited the crypt of a church, very different from the social centre we had left. The people sat on wooden benches in cold and narrow passages; they all seemed old and desolate, and the lighting was poor. They had a medical-aid post, however, with a large and reassuring Irish first-aider in charge, and a cat who wanted to try the taste of Dettol. In another railway arch there were as yet no bunks, the brickwork had not been roofed in, and the beds were set round the walls avoiding the places where the drips came in when it rained. The company sat in a circle round a red-hot coke brazier and the atmosphere was tropical. I went out anxiously trying to recall figures about carbon monoxide percentages. Back we went through the snow to our first shelter. Gargling was over and I had also missed baby bathing, instituted by the nurse, but there was a two-year-old in one of the beds, considering whether to develop scarlet fever or not. All was quiet above and below ground. We went into the inner room of the medical-aid post where there was a three-tier bunk, a table, cupboards of official equipment, some chairs and a primus stove which had already obliged by boiling the kettle for tea. Then I met the shelter marshal and he took me round now that everyone was abed and sleeping. The shelter is a large one and the bunks are set close; we wriggled through passages between them. The shelter marshal, who felt he must do the honours for me, shone his torch serially on "the fattest woman we've got," "husband and wife down below, children up top," and "our bad heart case." I felt apologetic at this unauthorised peep-show, but the sleepers never stirred. I saw the latrines, chemical buckets with seats, just adequately screened with canvas, and I saw the place where the new water-closets are being built at speed—the workmen were in at eight on Sunday morning. The marshal was keen, proprietary and kind; he clearly felt it was his shelter. I reflected that the nurse had called it "my shelter," and the P.S.U. referred to it as "one of ours." No doubt these sleepers felt it belonged to them, and it was certainly theirs if numbers count. And the local authority has an official claim.

But it must be the universal feeling of ownership which makes this one of the good shelters, and which will raise the standard in all shelters in time. I went to bed at last in the bottom tier of the bunk in the medical-aid post, and discovered a new and forcible objection to lying within nine inches of the floor; the insecticide with which the P.S.U. in their cleansing operations liberally sprinkle all floor cracks is so powerful that I began to suspect myself of having insect blood. But the bunk was comfortable and the Government blankets warm; I went to sleep instead of dying. In the morning, when we went up blinking into the daylight, the wind off the river smelt strange. We breakfasted with the P.S.U. to the melodies of what one of them, contemplating the labours ahead, called "Eine kleine Latmusik."

* * *

I wish I had a penny—tax-free, of course—for every time I have been to a pantomime. As a boy a taste for low comedy and catchy airs often took me, with a fellow-addict, to the gallery of the local theatre during the Christmas holidays. Now, as befits a dutiful parent, I have had to resume the practice. But no longer do I frequent the gallery; instead, I go once a year only and then affluently in the stalls. This year the slapstick was well up to standard and I found myself waiting eagerly for the old jokes and laughing at them anew. Once more I noted how the pantomime tradition permits the author to play fast and loose with the plot of the story, and the satisfactory—not to say smug—way in which good triumphs over evil and right over might. It is really deplorable how so many of us applaud the moral principle on paper without bothering a bit about it in fact. Contrary to my experience of fairy queens, who generally look obese and hypertensive, this year's model was, I thought, a trifle on the pale side and looked as though she could have done with a course of Blaud's pill. But it was heartening to see how we can laugh at our present misfortunes, the children especially being delighted with anachronistic references to sirens, shelters and gas-masks. As I grow older I find myself paying less attention to the players and more to the children in the auditorium. How they do laugh, to be sure, particularly at somebody's discomfiture. The upsetting of the dame on her milking-stool by the comic cow was received with sheer and shrill ecstasy—even when it happened for the third time. Next year I should like to sit at right angles to the stage in the gangway between the stalls and the pit so that I can really watch the audience without getting a wry neck.

* * *

One night one end of the nurses' home was wrecked by a bomb, but happily they were all over at the hospital, most of them doing voluntary duty admitting casualties. The next day one of them received a wire from her father in the country: "Have heard the news pack everything and come home." She wired back: "Nothing left to pack not coming."

* * *

A few days ago the *Times* on its middle page published a letter from an army officer of high rank in which he said: "Our new armies are being officered by classes of society who are new to the job. The middle, lower middle, and working classes are now receiving the King's commission. These classes, unlike the old aristocratic and feudal (almost) classes who led the old army, have never had 'their people' to consider. They have never had anyone to think of but themselves. This aspect of life is completely new to them, and they have very largely fallen down on it in their capacity as army officers. . . . These young officers . . . have been reared in an atmosphere in which the State spoon-feeds everybody from cradle to grave, and no-one feels any responsibility for his fellow men." This reactionary little swing, with its implied boastfulness, is without doubt due to our successes in the Western desert. Self-esteem is being restored, self-confidence is coming back, and must find expression if not by the sword then by the pen. The hackles are up, the erectores pilorum prance, the adrenals swashbuckle, the high gods in the cortex are ignored. After Dunkirk

it was a very different story. We had been defeated, the nation was as one man, "one family" the *Times* told us, fear had made kindred of us all, protoplasm sought brother protoplasm, and we humbly felt the brotherhood of man. But I think that the editor of the *Times*, or whoever is responsible for vetting their correspondence, should realise that the process that is so obviously gripping the Colonel has got its hold on the rest of the nation too, even including "the middle, lower middle and working classes." Anyhow Mr. Priestley will put all that right next Sunday.

Letters to the Editor

PREVENTION OF DIABETES

SIR,—Professor Himsworth (*Lancet*, Jan. 4, p. 24) states with regard to the data presented by Haist, Best and Campbell in the *New England Journal of Medicine* (1940, **223**, 607) that "far from indicating rest of the islet tissue the authors' data concerning the effects of starvation, high fat diets and excessive administration of insulin can be more easily interpreted to mean overstrain of that tissue." Part of the evidence in question comes from experiments in which dogs, made permanently diabetic by treatment with anterior pituitary extract, were fed on a diet of pure fat (beef suet). Mr. H. P. Marks and myself (*J. Endocrinol.* 1939, **1**, 470) found that this procedure not only almost completely abolished glycosuria and ketonuria in such a dog, but increased the proportion of a test dose of glucose retained by the animal from 20% to 80%. It does not seem possible that this increase in the sugar tolerance of the diabetic animal was brought about by an overstrain of its islets. Perhaps I may quote our tentative explanation of these observations—"the pancreas of the pituitary-diabetic dog contains a small amount of insulin which, however, is required little, if at all, for the regulation of metabolism when a diet of pure fat is given. This insulin therefore accumulates in the pancreas and is available to ensure the proper metabolism of at least a portion of a small dose of ingested carbohydrate, in spite of the fact that, in accordance with Himsworth's ideas, the insulin-sensitivity of the tissues may have been depressed by the high-fat diet." Himsworth's theory, that the sensitivity of the tissues to the action of insulin is diminished by a diet of fat, does not appear to be incompatible with the belief that the absence from the diet of sugar, or glucogenic substances, rests the insulin-secreting mechanism of the pancreas.

Professor Himsworth also states that the views expressed by Professor Best and his colleagues, and their suggestions for medical treatment, do not depend on evidence tested in the clinic. Discussion of the general sense of clinical evidence is beyond my proper scope, but I cannot refrain from quoting from the clinical investigations of Karl Petrén, which are not mentioned by Professor Best and his colleagues, and which indeed appear to have received too little notice generally. "In grave diabetes, I have for some years past often used one, two or three successive days of a diet of only butter (about 100–200 g.)" (*J. metab. Res.* 1924, **5**, 34). In this paper Petrén gives numerous examples of the treatment of severe diabetes with a diet consisting almost completely of fat.

F. G. YOUNG.

National Institute for Medical Research, Hampstead.

DYSPEPTICS IN THE ARMY

SIR,—It would appear from your leading article of Jan. 11 that the figures and conclusions of Mr. R. T. Payne and Dr. Charles Newman (*Brit. med. J.* 1940, **2**, 819) are being accepted as the explanation of dyspepsia in the Army. I have been astonished that so far no comment, critical or otherwise, has been made, or at any rate published. I find that the data in this article are almost wholly incomprehensible in relation to my own experience and that of other gastro-enterologists working in the Army with whom I have discussed them.

We are asked to believe that nearly 90% of dyspepsia in the Army is due to peptic ulceration. It may be that some authorities wish to believe that all dyspepsia in the Army is organic, and if so this article must indeed represent an almost complete wish fulfilment. I believe that this is far from the truth. Of 287 cases of dyspepsia these authors found 226 "proved" ulcer cases (though in 8 the site was undetermined) and another 21 "probable" ulcers, making a total of 247 ulcers out of 287 alleged unselected cases of dyspepsia. With the items listed under indefinite (4) and wrong diagnosis (11), carcinoma, volvulus and gastro-enteritis (7), I am not concerned, but on the figures for gastritis and duodenitis (7) and neurotic and functional (11)—or say 3%—I should like to make some comment.

We are reminded in your leader that a soldier is only a civilian dressed up in uniform. Even in civilian hospital gastro-enterological practice, not more than one in four cases with dyspepsia as the presenting symptom are found to have organic disease; the rest are gastric neuroses. What then has happened to these cases in the Army? What has happened to the small but quite definite group of reflex dyspepsia, for example of gall-bladder origin, the dyspepsia of early pulmonary tuberculosis, that of faulty mastication, dental and mechanical origin, and of achlorhydric dyspepsia? If the incidence of peptic ulcer is so high why have we not seen more cases of gastro-duodenal hæmorrhage and perforation?

With such a high proportion of "proved" ulcers we are entitled to know the nature of the proof accepted by the authors in compiling their diagnostic tables. In one line of the article they speak of exact diagnosis but in the next state that radiography was often done too late to reveal an ulcer crater. It is possible that the faulty diagnosis of peptic ulcer may be related to the type of X-ray plant available for use in the majority of base hospitals which, in the hands of the most expert radiologist, may hardly be adequate for exact gastro-duodenal X-ray work; or it might be ascribed to the need for entering an "exact" diagnosis before a case was evacuated to the U.K. How many times has accuracy in diagnosis been sacrificed to the necessity of saying "something definite" for the purpose of transfer and evacuation? Yet these diagnoses must perforce be used by the medical disembarkation and distributing headquarters and provided the authors with their suspected gastric and duodenal cases in the hospitals where they saw them. Apart from diagnostic accuracy this method of selection is surely unsatisfactory as a means of providing a fair sample of dyspepsia in the Army, although it is quoted as a representative and unselected sample of dyspeptic cases.

Next we are asked to believe that only 3% of cases of dyspepsia are neurotic and functional. My colleagues in psychological medicine do not usually lack the ability or courage to present their views in your columns. Does their silence mean that they agree with this astonishing conclusion? My interest is in organic medicine but in gastro-enterology it is impossible to ignore the part that psychological factors play in producing gastric symptoms. My experience among army dyspeptics does not materially differ from that of civilian hospital and private practice. My present figures indicate that 60% of army dyspeptics are fundamentally neurotic, the dyspepsia being either purely psychogenic or psychogenic factors being responsible for a continuance of symptoms far beyond the "organic" span. Even among cases with a past history suggestive of ulcer, or cases of proved ulcer, the perpetuation of symptoms (despite full ulcer dietetic regime) when all possible complications of the "ulcer" have been excluded suggest that some of these patients show a psychological "pattern" reaction reproducing subconsciously a syndrome which once may have had organic significance but is now purely psychogenic.

Finally I have reason to doubt the view that cases of persistent dyspepsia probably have severe gastritis. The appeal to direct inspection of the stomach by gastroscopy among 58 otherwise negative dyspeptics with persistent symptoms has shown that in two-thirds the mucosa was normal, in one-fifth trivial to moderate superficial mucosal changes, for the most part capable of being satisfactorily treated, were present. Only in about one-seventh were serious organic mucosal changes found, including acute ulcer missed by X ray, chronic patchy gastritis, anastomotic gastritis and atrophic gastritis.

Unfortunately only a small number of these gastric neuroses show easily detectable evidence of neurotic illness—e.g., somatic symptoms, tremors, sweats, palpitation, acknowledged anxiety, fears, extreme boredom. A

few are highly suggestible, while a still smaller number are frankly hysterical showing induced pseudo-epileptic crises, anæsthesias and the like. Is it because the psychotherapeutic outlook for the neurotic dyspeptic is not very favourable that the problem has not gained more active attention from our colleagues in psychological medicine?

Pinewood, Berks. STANLEY J. HARTFALL.

B.M.A. MEDICAL PLANNING COMMISSION

SIR,—You suggest in your last issue that the Medical Planning Commission set up by the B.M.A. can properly claim to be representative. May an old reader join issue with you on this point? It is assuredly not representative of all those interested in the future of the medical services. Perhaps it was never intended to be so, but to express only the views of the medical profession on its own future. Is it even representative of the medical profession? Where are the left-wing representatives, whose influence might go some way to neutralise the almost overwhelming preponderance of those whose loyalties and already-announced policies tie them to the chariot wheels of the B.M.A.? It is surely mere affectation, for example, to suppose that the Medical Practitioners Union (which is already exploring similar ground) stands for nothing at all in the medical profession, or is incapable of contributing useful material to the commission's deliberations. It is quite possible that the M.P.U. would decline to send representatives, but it should surely have been asked. It may perhaps be doubted whether any body representative only of the medical profession, and excluding representatives of the Services, the Ministries and the M.P.U., can possibly hope to command any appreciable degree of public confidence.

Sevenoaks. GORDON WARD.

SIR,—Your leading article of Jan. 11 is timely. Reference is made to the inexplicable secrecy in which the commission was established; and your criticism of the age-distribution amongst its personnel seems to be justified. But what is most important is your opportune reference to the tendency which has undoubtedly existed for some time past for such bodies to regard themselves as more representative of the profession than they are; and to the undemocratic method of creating a finished scheme when the vast majority of the profession have not had any opportunity of expressing their approval or judgment on it. This practice has caused anxiety in the minds of many members of the profession; an anxiety which has found expression in numerous letters published in the medical press during the past twelve months.

The decision to create a commission to inquire into the present organisation of the medical profession is most wise; and no-one will doubt that the B.M.A. possesses excellent constitutional advantages for appointing such a commission, and permitting it to function in the most efficient manner. But there is evidence to show that executive bodies have tended to lose sight of their democratic constitution; and to complete far-reaching arrangements affecting in a most intimate manner every member of the profession without first acquainting them with the details of the scheme, and without giving the profession as a whole the opportunity to discuss, to consider, to sanction or to modify arrangements which when brought into operation may prove so detrimental to the profession's well-being and to the community. The ever-increasing tendency to recognise more and more so-called ancillary services has not met with the unanimous approval of all members. The precedent thus created has already brought an ever-increasing number of requests from various bodies, whose formal recognition cannot ultimately be in the best interests of the profession or the general public. Furthermore, since certain of these bodies have received formal recognition, there is already evidence of an abuse of privilege which cannot be controlled, since the General Medical Council has no jurisdiction over the offenders. The ever-increasing number of foot doctors advertising in the public press is surely a testimony to this statement.

But perhaps the most striking example is given in the manner by which the original Emergency Medical Service scheme was established. Had the profession been given the opportunity of considering and discussing the details of this scheme, many of its gross absurdities, its injustices and its inherent weaknesses would have been pointed out and modified as the result of free debate and the knowledge of practical experience. But no such opportunity was ever given. The profession was asked to sign a form of registration in a purely voluntary capacity: it was asked to elect local emergency war committees, the characteristics of which were predetermined; and it became more and more obvious that the voluntary form of registration would become a binding and compulsory force once a state of war existed. Many individual medical men, both consultants and general practitioners, have found themselves as a result in a position where their rights as individuals and their freedom as citizens, indeed the very financial security of their practices, have been swept away from them, leaving them stranded, and without any means of redress, justice or compensation. The many cases of hardship now existing among all grades of the profession throughout the country as a direct consequence of the operation of the original E.M.S. scheme stand as a certain indictment against the executive bodies responsible for these Star Chamber methods. No-one will deny that during a state of national emergency hardships and sufferings are bound to occur; and every right-minded citizen is willing to take his fair share and to relieve as far as possible the misfortunes of his neighbours. But the operation of the original E.M.S. scheme made it impossible for mutual assistance to be given. Membership of the Protection of Practices Scheme was not compulsory, and the sanction or the recommendation of a local medical war committee was necessary before the individual could do anything. These hard-worked bodies must have found it extraordinarily difficult to cope with their duties, and although they have been much criticised they have functioned as satisfactorily as was possible under the circumstances. Ultimately it was found expedient to revise the E.M.S. scheme fundamentally in the light of practical experience; but not before irreparable damage had been done to the practices of many. Would not free debate and discussion have prevented these adverse results?

If the planning commission will seek to obtain evidence from all possible sources and will publish this evidence with its accompanying recommendations and report thereon in the recognised medical press; and if the results of its deliberations are made open to the profession for free debate and sanction, the commission will have fulfilled an excellent and most timely duty for which the personnel will receive the full gratitude of all. But if the executive of the B.M.A., having received the report and recommendations of the planning commission, should draw up and commit the profession to any reorganisation, or to schemes of national service; if it should present to the rank and file a "fait accompli" and a request for signature in agreement, as happened in the case of the E.M.S., the executive will exceed the powers of its own constitution; and not only will it fail in its duty to the profession, but it will also create a most difficult and undesirable schism. Already another professional body has been circularising the profession with details of a proposed scheme of nationalisation. This division of the profession into two rival camps is surely most undesirable at the present time; and if a further splitting up is to take place as the result of a strongly organised opposition to these undemocratic methods the end-result will be that the Government will step in and decide the issue once and for all. A house divided against itself cannot stand.

The coming of peace will not bring a solution to the many social and national difficulties of which mankind has now become conscious. It is probably true to say that not since the Reformation have the peoples of Europe been so shaken by ideological differences, both national and human, political and civil, economic and financial. These ideological differences have now reached such a degree that they have become blatant signs of gross disease in the civilised state of our western world. Their interpretation and their appropriate treatment will require the concentrated efforts of all concerned under a patient, wise and philosophical leadership. Nor is it possible to assess with any degree of accuracy how the requirements of the so-called "New Order" may best be fulfilled in so far as the medical profession is concerned in

carrying out its duty to the community. Nevertheless, it is obvious that the most careful and statesmanlike planning will be required if our traditions, our academic independence, our professional freedom, and above all our ethics, are to continue to exist, and to regain their erstwhile high standard. No claim is made for a revival of altruism in our medical life. But few will deny that, in company with other professions and callings, the heat of intense competition and the economic difficulties of modern life have brought about an unhealthy state in the general organisation of the medical profession, which manifests itself not only in the widespread apathy to these most important medico-political considerations but in the economic state of our voluntary hospitals, and in the very relationship between the profession and the community. Is not the growth and development of quackery during recent years in itself an indictment against our profession? A section of the community will always be thrilled by the jargon of the charlatan and flattered by the panderings to its pseudo-intellectualism; but the fact remains that if the profession as a whole satisfied the demands of the community as a whole quackery could not grow and thrive as it has done.

At no time has the medical profession been in greater need of strong leadership than at present; strong statesmanlike leadership to carry out much-needed reforms; to enable the profession to assume its true relationship to the community and to the state without loss of that dignity, prestige and independence for which the many illustrious men of the past strove so hard to achieve and to hand on to us as an inheritance and trust.

Bournemouth. LLOYD OLVER.

DIPHTHERIA PROPHYLAXIS

SIR,—Now that diphtheria prophylaxis has been taken up by the Government as a national measure it is obviously up to all local authorities, all educational authorities and all medical officers of health to endeavour to get as large a proportion of our child population immunised as possible in order to get the maximum beneficial effect from the measure. It seems to be admitted that a half-hearted resort to this measure is likely to be useless, if not worse than useless. For this reason Dr. Benjafield's letter in your issue of Jan. 11 is to be heartily welcomed. But I would like here to make a practical suggestion to remedy a rather glaring anomaly—viz., that as immunisation is to be done chiefly through the schools, it should be done on the basis of attendance at a particular school, rather than on the basis of the child's residence in the area of a particular authority. It frequently happens, especially in rural areas, that children residing in the area of one local authority may be attending a school situated in the area of another authority, and therefore are liable to be excluded when that particular school is being immunised. This is a very short-sighted policy, and there is the less excuse for it now that the Government is providing toxoid free of charge. Clearly, there should be a complete give and take between local authorities on this matter, and "Let them all come, the more the better" should be our motto.

Leicester. C. KILLICK MILLARD.

SAVING ON DRUGS

SIR,—In your leading article of Jan. 4 you remark that an insured person will not relish being refused his familiar medicine while its proprietary counterpart can be bought at any chemist's shop. Here you touch on a frailty common to all mankind, whether represented by insured persons or panel doctors: if the goods are there some of the public will have them, and if the drugs are there the doctor will prescribe them. The remedy is to cut off supplies of non-essential drugs, and then it will be as useless to try to buy or to prescribe them as to ask for an onion. I cannot think that makers of proprietary medicines will be allowed first call on supplies while doctors, hospitals and dispensers go begging. The revenue from patent medicines is too small to influence the Treasury.

If the therapeutic requirements committee can do no more than advise I agree that much of its work will be wasted, but in fact it can do much more than that. This committee seems to be in the position of an advisory body to a Government department. We are bound to assume that if the Ministry of Health tells the appropriate ministry that cargo space need not be used to bring certain goods to this country the goods will not come, and the recommendations of the therapeutic requirements committee will then have the effect of a departmental order. If the ministry which is advised by the committee acts on that advice the drugs on the non-essential list will soon be as obsolete as the banana. In any case, it seems fair to suppose that the committee which is to compile a war formulary, on the initiative of the Ministry of Health, will ignore the existence of those items which have been declared unnecessary. Incidentally, it is to be hoped that the Government will not use the power that it undoubtedly possesses under the Defence Regulations to forbid the prescription of any drug not included in the war formulary.

The inclusion of the wholesale drug trade in the formulary committee implies that the availability of supplies will be kept in view by the committee during the whole of its work. This is, of course, the crux of the matter—if all drugs were freely available there would be no need for a book of emergency recipes.

Let us hope that the formulary will not have to be in use for long and that we shall soon be back to the B.P. and the B.P.C. which take ten years' labour to produce instead of the "month or two" which you allot to the formulary committee. If the war formulary can be produced so speedily it will be because of the vast amount of work which has been done by the Pharmacopœia Commission and the Pharmaceutical Society in preparation for the next issues of their respective volumes, which cannot be published while the paper shortage lasts. We have had two important ad-hoc addenda to the B.P. since the war began and others are probably in the offing; this is a good record for a body which must move cautiously. Why you should suggest handing over the responsibility for the B.P. to the Ministry of Health I fail to understand. Why put old wine into new bottles? Why make the tax-payer pay for a job which now costs nothing, and the profits from which are spent on research for future pharmacopœias? Let us have the war formulary by all means, and quickly, but let us refrain from trying to take long views while visibility is bad.

Whitehall Place, S.W.1. F. C. GOODALL.

BREAD

SIR,—The present controversy regarding the composition of bread prompts me to recall the experiences of the last war when in the Mesopotamia campaign diseases due to vitamin deficiency were a serious problem. These are fully dealt with in the articles on beri-beri and scurvy in the Official History of the War (vol. i, Medical Services. Diseases of the War, vol. i, chaps. 14 and 18), which it was my privilege to write.

Up to 1917 fresh foods were almost unobtainable and the importance of the composition of the flour became enhanced. The British troops were supplied with bread and biscuits made from white flour and suffered from deficiency in the vitamin-B complex and the other important accessories which are present in wholemeal flour. In consequence a number of cases of beri-beri occurred. The Indian troops were supplied with a wholemeal flour (atta) and also with dhall (a lentil) both of which were rich in vitamin-B complex and the other accessory food factors in which white flour is deficient. Beri-beri did not occur in the Indian troops. The risk of beri-beri in British troops was obviated by the introduction early in 1917 of the issue on three days a week of bread composed of a mixture of wholemeal and white flour; also Marmite, which contains yeast extract and is rich in the vitamin-B complex, was issued twice weekly. There were no cases of beri-beri after the adoption of these measures.

It is now generally accepted that white bread and white flour are greatly inferior to wholemeal bread and flour as foods in a dietary where bread is the most important basic constituent, which is the case in war-time owing to unavoidable food shortage. In this war the Government have wisely decided that some action is necessary since the nutrition of the nation is of paramount importance to victory. The suggestion has been made by the Ministry of Food that the addition of synthetic vitamin B_1 and calcium carbonate to white flour would yield bread

which would compare favourably with wholemeal bread. On theoretical grounds there are serious defects in this proposition since vitamin B_1 does not supply the deficiencies of white flour in the vitamin-B complex, which includes many other vitamins than B_1, such as vitamin B_2 and B_6. Also the absence of vitamins A and E, nicotinic acid and riboflavin in the reinforced white loaf and the deficiency of mineral salts and fat are of great importance.

This criticism has been fully confirmed by Dr. Harriette Chick's research reported in THE LANCET of Oct. 26, 1940. It was clearly proved by feeding experiments on young growing rats that the reinforced loaf was inferior to the wholemeal loaf. The inferiority was attributed to lack of B_6 vitamins.

A solution of the present difficulty might be obtained as in Mesopotamia by the issue of bread composed of a mixture of white and wholemeal flour. A loaf made from equal parts of each kind of flour would, in my opinion, be much superior to the Ministry of Food reinforced loaf since, among other advantages, it would contain the vitamin-B_2 complex which is absent in the latter. A loaf composed of 75% wholemeal and 25% white flour would be still better and was shown in experiments in Mesopotamia to be very palatable. The perfect solution of the problem would be the universal use of a loaf composed of 100% wholemeal flour to which public opinion would soon be converted if the true facts were fully understood. The present stocks of white flour might be utilised by the provision of a mixed loaf, wholemeal and white, as suggested.

Wholemeal bread if properly baked has more flavour than white bread, and there is no evidence that the mass of the people will not eat it. It is important that the flour should be prepared so as to give a palatable and efficient product and that the baking process should be carefully regulated.

The universal use of wholemeal bread is by no means an insuperable problem. The education of public opinion, the coöperation of millers and bakers, and the application of experimental research so that efficiency may be ensured will do much to bring about this desirable reform. The gain to the nation in improvement of health would be incalculable.

London, W.1. WILLIAM WILLCOX.

MOSQUITOES INFESTING DEEP SHELTERS

SIR,—In your issue of Jan. 4 Mr. P. G. Shute described the infestation of deep shelters in London by the culicine mosquito *Culex molestus*. May I point out that this mosquito was first located in Britain by Mr. J. Staley and myself in October, 1934, when experimenting (at Hayling Island) with an egg-raft that we supposed to be of the ordinary domestic species *Culex pipiens*. In the following year we obtained further specimens of *C. molestus* both from eggs laid by a blood-gorged female caught in an hotel in Westminster and from larvæ collected in stagnant water adjacent to some mosquito-infested cottages in Hull.

During the years 1938 and 1939, at the request of the entomological department of the Natural History Museum and with the coöperation of the London County Council, we extended our research to various Thames-side districts, notably Battersea, Bermondsey, Chelsea, Deptford, Fulham, Greenwich and Isleworth; in all of these districts many houses and institutions were found to be periodically invaded by hordes of fiercely-biting females of *C. molestus*. At the outbreak of war local authorities naturally diverted their attention to more important matters and these investigations were suspended.

Both in the larval and adult forms *C. molestus* and *C. pipiens* resemble one another so closely that the presence of the former species in Britain was entirely overlooked up to November, 1934. The two species differ, however, in important respects. *C. molestus* is one of our worst biters, whereas *C. pipiens* rarely if ever attacks human beings, its customary victims being birds. Moreover, *C. molestus* is both *stenogamous* and *autogenous*: that is to say, the adults will mate in a very small space (even in a test-tube), and the fertilised females are able to lay *some* eggs (about 70) without having had a preliminary meal of blood. Of the 2000 odd species of mosquitoes known in the world, only two besides *C. molestus* have so far been found to be autogenous—namely, the British species *Theobaldia subochrea* and the Australian species *Aedes concolor*. Combining as it does the characteristics of stenogamy and autogeny *C. molestus* is extremely easy to breed in small laboratory jars all the year round. The methods of distinguishing *C. molestus* and *C. pipiens* from one another are fully described in my book "The British Mosquitoes" (British Museum, 1938), which was unfortunately in print before our Thames-side data were available for publication.

In conclusion, I may perhaps mention that the total number of British mosquitoes at present known is not 29 (as Mr. Shute states) but 30, owing to our discovery of the species *Theobaldia longiareolata* at Portsmouth a few months ago. JOHN F. MARSHALL.

British Mosquito Control Institute, Hayling Island.

Infectious Disease in England and Wales

WEEK ENDED DEC. 21, 1940

Notifications.—The following cases of infectious disease were notified during the week: **smallpox, 0; scarlet fever, 1496; whooping-cough, 2395; diphtheria, 1378; enteric fever, 16; measles (excluding rubella), 15,221; pneumonia (primary or influenzal), 970; puerperal pyrexia, 108; cerebrospinal fever, 133; poliomyelitis, 13; polio-encephalitis, 3; encephalitis lethargica, 16 (13 at Colchester); dysentery, 152; ophthalmia neonatorum, 50.** No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on Dec. 27 was 2170, including: scarlet fever, 304; diphtheria, 325; measles, 906; whooping-cough, 109; enteritis, 30; chicken-pox, 193; erysipelas, 51; mumps, 31; poliomyelitis, 1; dysentery, 4; cerebrospinal fever, 37; puerperal sepsis, 8; enteric fevers, 2; german measles, 4; other diseases, (non-infectious), 69; not yet diagnosed, 105.

Deaths.—**In 126 great towns there was no death from smallpox, 1 (0) enteric fever, 3 (1) from scarlet fever, 16 (0) from whooping-cough, 16 (1) from measles, 39 (2) from diphtheria, 24 (1) from diarrhœa and enteritis under 2 years, and 30 (5) from influenza. The figures in parentheses are those for London itself.**

There was 1 fatal case of enteric fever in Greater London and 1 in Oxford: Liverpool reported 5 deaths from diphtheria, Birkenhead 4 and Birmingham 3. There were 5 deaths from whooping-cough at Birmingham.

The number of stillbirths notified during the week was 204 (corresponding to a rate of 43 per thousand total births), including 14 in London.

WEEK ENDED DEC. 28

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 1193; whooping-cough, 1846; diphtheria, 1090; enteric fever, 20; measles (excluding rubella), 13,188; pneumonia (primary or influenzal), 857; puerperal pyrexia, 72; cerebrospinal fever, 171; poliomyelitis, 8; polio-encephalitis, 2; encephalitis lethargica, 2; dysentery, 112; ophthalmia neonatorum, 44. No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on Jan. 3 was 2246, including: scarlet fever, 316; diphtheria, 346; measles, 907; whooping-cough, 112; enteritis, 31; chicken-pox, 203; erysipelas, 51; mumps, 33; poliomyelitis, 1; dysentery, 10; cerebrospinal fever, 40; puerperal sepsis, 8; enteric fevers, 6; german measles, 3; other diseases (non-infectious), 109; not yet diagnosed, 78.

Deaths.—**In 126 great towns there was no death from smallpox or enteric fever, 3 (0) from scarlet fever, 16 (1) from whooping-cough, 23 (4) from measles, 30 (0) from diphtheria, 39 (2) from diarrhœa and enteritis under 2 years, and 40 (1) from influenza. The figures in parentheses are those for London itself.**

Birmingham reported 9 deaths from diarrhœa, 4 from influenza, and 4 from whooping-cough. There were 4 deaths from diphtheria at Liverpool.

The number of stillbirths notified during the week was 161 (corresponding to a rate of 53 per thousand total births), including 8 in London.

"... The superior doctor serves the nation; the middle-grade doctor, the individual; the inferior doctor treats physical ailments."—Proverb from The Chinese Way in Medicine, by EDWARD H. HUME (Oxford University Press).

Obituary

HERBERT TILLEY

M.D. LOND., F.R.C.S.

Mr. Herbert Tilley, who died at Weybridge on Jan. 6, at the age of 74, was one of the later generation of pioneers of rhino-laryngology. When he qualified the new specialty was already somewhat grudgingly acknowledged, but Tilley did much to secure a wider recognition for it and to attract the right men to its service.

Elliott & Fry

Born at Shepton Mallet, he was educated at Queen's College, Taunton, and at University College, London, where he won many scholarships. He qualified in 1890 and took his M.D. the following year, obtaining his F.R.C.S. in 1898. For a time he practised in Hampstead but he was soon appointed to the staff of the Golden Square throat hospital where his junior colleagues have many pleasant memories of his kindness and helpfulness. He left to return to his old hospital as the first specialist to be appointed surgeon in charge of the ear, nose and throat department. He guided the department with enthusiasm and wisdom, and after its amalgamation with the Royal Ear Hospital he saw it fittingly housed, through the generosity of Mr. Geoffrey Duveen, in a new building beside the hospital. He was elected a fellow of University College, but outside his school he also held important posts. He was laryngologist to the Radium Institute and consulting aural surgeon to the Ministry of Pensions. He examined for the University of London, and with Mr. Arthur Cheatle he was able to persuade the senate to allow otology, laryngology and rhinology to be taken as part of the M.S. examination. His presidential address to the section of otology of the Royal Society of Medicine in 1919 was an impressive plea for the better teaching of the specialty; he urged medical schools to make an attendance of three months in the ear and throat department compulsory for their students. His early experience in general practice had impressed on him the need of attracting to the specialty men with a thorough knowledge of general medicine and surgery, "for," he said, "we can expect little from those who, with a bare qualification to practise, at once focus attention on some special department of the body." He was a regular attendant at the Laryngological Society and later at the corresponding section of the Royal Society of Medicine; when he spoke at these meetings he always had something useful to contribute and was listened to with respect. From 1931 to 1932 he served as president of the Medical Society of London, and he was also well known on the continent and in the United States where he was elected a member of the American Laryngological Society.

For a long time Tilley felt that his connexion with the board of the Semon lecture trust debarred him from the lectureship. But in 1934 he was persuaded to accept and his address on the inflammation of the nasal sinuses was an effective summary of his views on the pathology of sinusitis. He contributed many articles to medical textbooks and he almost completely rewrote the fourth edition of De Havilland Hall's Diseases of the Nose and Throat. A colleague writes: "Tilley was a careful and accurate observer and possessed of sound common sense. He had established a solid reputation as a clinician and obtained an extensive practice. His charm of manner and attractive personality won for him the affection of his colleagues and of a large circle of patients.

LOUIS HENDERSON MACDONALD

M.B. BIRM.; LIEUTENANT, R.A.M.C.

Lieutenant L. H. Macdonald's death was announced in an Army casualty list dated Jan. 6. He took his conjoint qualification in 1924 and graduated M.B. from the university of Birmingham the same year. He held house-appointments at the Birmingham General Hospital and was for a time assistant medical officer in the V.D. department there. He afterwards became assistant pathologist and bacteriologist to the Dudley Road Hospital, and a physician there remembers him as a quiet keen worker, always ready to help and a pleasant and agreeable colleague. But he was intensely reserved and had few intimate friends. Four years ago he left Birmingham to set up in practice in Portsmouth where he enjoyed his work and was very happy.

ROBERT BUCHANAN FORBES McKAIL

M.B. GLASG., D.P.M.

Dr. R. B. F. McKail, who died on Jan. 10, after a distressing and protracted illness borne with fortitude, was educated at Allen Glen's School. In his student days at Glasgow University he won the Arnott prize, Black medal and Muirhead prize, and after he qualified in 1909 he worked for two years as demonstrator in the anatomy department. In 1911, he entered the service of the Lancashire mental hospitals board at the county mental hospital at Prestwich and later served under the same authority at their hospitals at Winwick and Whittingham. During the last war, he served as a captain in the R.A.M.C. in Gallipoli, Egypt, Sinai and Palestine. He was twice mentioned in despatches, but his health suffered and he never fully recovered.

On demobilisation in 1920, he was appointed deputy medical superintendent at the Calderstones Certified Institution for Mental Defectives—once again under the Lancashire mental hospitals board, and in 1933 was promoted to be the first medical superintendent of the Brockhall Certified Institution at Langho, near Blackburn. In September, 1937, continued ill-health compelled him to retire and he returned to his native city of Glasgow.

His wife died three years ago.

A colleague writes: McKail was a keen follower of sport and athletics and his varied interests made him a most acceptable social companion to all sorts and conditions of men. During the last years of his active professional life, his knowledge, energy and mastery of detail were devoted to the preparation of the Brockhall extensions scheme; rapidly failing health prevented him from seeing the fruits of his labours. But the institution, now almost completed, will stand as a tribute to his wisdom and foresight.

THOMAS LAWSON McEWAN

M.B. ST. AND., D.P.H., F.I.C.

Dr. Lawson McEwan, who died on Jan. 13, aged 48, was the first bacteriologist of the county of Devon and he did not live to see built the new laboratory which he had planned with so much care.

McEwan was educated at the Harris Academy, Dundee, and at the University of St. Andrews, where he graduated B.Sc. in 1914, with honours in chemistry, mathematics and physics. He then proceeded to London where he continued to study chemistry and biology at King's College, University College and Birkbeck College. Later he became principal assistant to the public analyst for the city of Westminster and for the borough of Fulham. At the beginning of the last war he held a commission in the Argyll & Sutherland Highlanders, till at the end of 1916 he was transferred to the Ministry of Munitions as a research chemist. The following year he went to the research department at Woolwich Arsenal, and for his work here he was elected F.I.C.

He had always wanted to take up medico-scientific work but the war had interrupted this project. Later, however, he returned to St. Andrews to study medicine. He was an outstanding student, and in 1928 he graduated M.B. with special distinction, gaining the McEwan prize in surgery. After serving as house-physician at Dundee Royal Infirmary, he became assistant to Prof. W. J. Tulloch. In 1930 McEwan was appointed bacteriologist to the Devon county council. He organised this new department with great skill and enthusiasm and gradually built up a first-class laboratory.

In 1919 he married Elizabeth Holt Ogilvy, who survives him with two daughters.

Medical News

University of London

At recent examinations the following were successful :—

M.D.

Branch I (medicine).—Margaret D. Baber, Univ. Coll. ; and R. S. Lawrie, Middlesex.

Branch II (pathology).—S. D. Elliott, Univ. Coll. ; and Herbert Spencer, St. Mary's.

Branch IV (midwifery and diseases of women).—Mary Kane, King's Coll. and Cardiff ; Kathleen M. Robinson, Roy. Free ; and I. E. J. Thomas, Guy's.

Branch V (hygiene).—Kathleen M. Hart, Roy. Free.

M.S.

Branch I (surgery).—A. D. Le Vay, Univ. Coll.

D.M.R.

Douglas Andrew, H. F. Francis, and J. J. Richmond.

National University of Ireland

The honorary degree of D.Sc. has been granted to Dr. Gordon Holmes, F.R.S., and Dr. F. M. R. Walshe, "in view of their distinction as neurologists, and in recognition of their valuable contributions to medical literature," and to Prof. Ernest Hey Groves, "in view of his eminence as an orthopædic surgeon, and an internationally recognised authority on the literature of his subject."

The Minister of Health has made an order applying to the Greater London evacuation areas the defence regulation which provides for the compulsory evacuation of children suffering in mind or body as a result of hostile attacks (*Lancet*, 1940, **2**, 816). The areas to which the regulation now applies are :

The City of London ; the metropolitan boroughs of Battersea, Bermondsey, Bethnal Green, Camberwell, Chelsea, Deptford, Finsbury, Fulham, Greenwich, Hackney, Hammersmith, Hampstead, Holborn, Islington, Kensington, Lambeth, Lewisham, Paddington, Poplar, St. Marylebone, St. Pancras, Shoreditch, Southwark, Stepney, Stoke Newington, Wandsworth, Westminster and Woolwich ; the county boroughs of Croydon, East Ham and West Ham ; the boroughs of Acton, Barking, Brentford and Chiswick, Chingford, Ealing, Edmonton, Erith, Hornsey, Ilford, Leyton, Mitcham, Tottenham, Walthamstow, Wanstead and Woodford, Willesden and Wood Green and the urban district of Penge ; and the evacuable parts of the boroughs of Barnes, Beckenham, Bexley, Dagenham, Dartford, Gravesend and Wimbledon, and the urban districts of Crayford, Enfield, Hornchurch, Merton and Morden, Northfleet, Swanscombe, Thurrock and Waltham Holy Cross.

Dr. Allen Daley will take the chair when Lieut.-Colonel F. C. Temple, M.Inst.C.E., addresses the Royal Society of Arts on the municipal manufacture of humus from habitation wastes. The meeting will be held on Jan. 29, at 1.45 P.M., at the house of the society, John Adam Street, Adelphi, W.C.2. On Feb. 12 Mr. G. V. Jacks, deputy-director of the Imperial Bureau of Soil Science, will speak on humus and the farmer. On April 30, Dr. O. R. Tisdall will read a paper on the general practitioner and scientific thought.

On Tuesday, Feb. 4, at 2.30 P.M., at 26, Portland Place, London, W.1, Sir Walter Langdon-Brown will deliver a Chadwick lecture. He will speak on mental health in war-time. Further particulars may be had from the secretary of the trust at 204k, Abbey House, Westminster, S.W.1.

Mr. Somerville Hastings will be in the chair when the Society for Cultural Relations with the U.S.S.R. meet at 11, Chandos Street, London, W.1, on Jan. 31, at 2.15 P.M. Prof. F. Wood Jones, F.R.S., Dr. J. Lipetz and Dr. Joan McMichael will open a discussion on medical theory and practice in the Soviet Union.

On Monday, Jan. 27, at 2 P.M., at the section of odontology of the Royal Society of Medicine, Mr. A. H. McIndoe will read a paper on plastic surgery in relation to fractures of the facial bones. On Tuesday, Jan. 28, at 2 P.M., at the section of medicine, Colonel Lionel Whitby and Dr. Janet Vaughan will open a discussion on the therapeutic value of transfusion of derivatives of blood.

The Royal Society of Edinburgh have appointed Messrs. Oliver & Boyd (Tweeddale Court, Edinburgh) to be their publishers. Copies of the transactions and proceedings of the Society will now be supplied by this firm.

A meeting of the Medical Society of London will be held at 11, Chandos Street, W.1, on Monday, Jan. 27, at 2.30 P.M. Mr. Zachary Cope will speak on latent shock ; Dr. Wilfred Oakley on the use of delayed-action insulins in war-time ; and Mr. Eric Samuel on X-ray examination in relation to the treatment of air-raid casualties.

George medals for gallantry during air-raids have been awarded to the following medical men : Dr. André Bathfield, resident medical officer at the Royal Chest Hospital, London ; Dr. H. N. Gregg, medical officer in the E.M.S. at Coventry ; and Dr. Robert Lindsay, medical officer in a casualty mobile unit at Folkestone.

The telephone number of the Emergency Bed Service is now BIShopsgate 8491.

FACTS FOR THE TAXED.—A thing that many a doctor lacks is knowledge about income-tax. All you who think you pay too much—and legion is the name of such—are vehemently urged to look at Mr. A. L. Boyden's book. For, coming, as he does, to you straight from the Inland Revenue, Boyden, if anyone, can say exactly what you've got to pay. Income Tax for Medical Practitioners. London : *The Practitioner* with Eyre and Spottiswoode. Pp. 147. 6*s*.

Births, Marriages and Deaths

BIRTHS

KEATINGE.—On Jan. 10, at Compton, Winchester, the wife of Major L. R. H. Keatinge, R.A.M.C.—a son.

MATTHEW.—On Jan. 15, at Inverness, the wife of Captain H. J. S. Matthew, R.A.M.C.—a son.

STEWART.—On Jan. 15, at Lymington, Hants, the wife of Dr. G. R. Shipley Stewart—a son.

TILL.—On Jan. 9, at Witney, Oxon, the wife of Major A. S. Till, R.A.M.C.—a daughter.

MARRIAGES

ELLIS—RUSSELL.—On Jan. 18, in London, Richard White Bernard Ellis, F.R.C.P., to Audrey Eva Russell, M.B.

GRANT—KINGHAM.—On Jan. 16, at Farnham, William Russell Grant, M.R.C.S., Captain R.A.M.C., to Sheila Mary Kingham.

HARGREAVES—BERRY.—On Jan. 16, at Northwood, Anthony Hargreaves, M.B., Flying Officer R.A.F.V.R., to Anna Marcia Berry, M.B.

HORTON—STERN.—On Jan. 18, in London, William Henry Horton, to Ruby Olive Stern, M.D.

MORRIS—SMITH.—On Jan. 4, Robert Morris, M.B., Lieutenant R.A.M.C., son of Dr. R. A. Morris, of Harrogate, to Doreen Smith.

OLLERENSHAW—BLOUNT.—On Jan. 16, at Didsbury, Gerald James Watson Ollerenshaw, B.M., younger son of Mr. Robert Ollerenshaw, F.R.C.S., to Patricia Blount.

DEATHS

ARCHER.—On Jan. 13, at Littleham, Exmouth, Edmond Lewis Archer, M.B. Durh., formerly of Moonta, South Australia, aged 91.

DICKINSON.—On Jan. 21, in London, Thomas Vincent Dickinson, M.D. Lond., M.R.C.P., aged 83 years.

FRASER.—On Jan. 17, at Harpenden, Herts, Hugh Fraser, M.B. Aberd.

HOLLAND.—On Jan. 16, Charles Thurstan Holland, Ch.M., LL.D. Lpool, F.R.C.S.

LEWIS.—On Jan. 17, at Birkdale, Ernest William Lewis, M.D. Edin., F.R.C.S.E., J.P.

LOGAN.—On Jan. 13, at St. Anns, Carlisle, George Duncan Logan, M.D., aged 81 years.

MCEWAN.—On Jan. 13, Thomas Lawson McEwan, M.B. St. And., D.P.H., F.I.C., bacteriologist and pathologist to the county of Devon.

NEWNHAM.—On Jan. 11, at Clifton, Bristol, William Harry Christopher Newnham, M.B. Camb., aged 84.

PAUL.—On Jan. 17, at Grayshott, Hindhead, Frank Thomas Paul, D.Sc., Ch.M. Lpool., F.R.C.S.

WILLIAMS.—On Jan. 16, suddenly, at Peterston-super-Ely, Glamorgan, George James Williams, M.D. Durh., formerly of Haltwhistle, Northumberland, aged 76.

Appointments

BRICE, HILDA, M.B. Manc. : R.M.O. at Leicester General Hospital

COLLS, MARGARET, M.R.C.S. : temp. M.O. at the Women's Internment Camp, Isle of Man.

GRANT, H. M., M.B. Edin., F.R.C.S.E. : surgical registrar at the Bolingbroke Hospital, London.

LINACRE, H. L., M.B. Sheff., D.A. : Mayo fellow in anæsthetics at the Royal Sussex County Hospital, Brighton.

MASON, M. L., M.R.C.S. : R.M.O. at King Edward Memorial Hospital, Ealing.

RICHARDS, D. A., M.B. : examining surgeon under the Factories Act 1937 for Appleby, Westmorland.

•SHARPE, WILLIAM, M.B. Glasg., D.P.H. : at Monsall Hospital, nr. Manchester.

STOTT, C. F., M.B. Manc. : temp. asst. M.O.H. for Stoke Newington.

TEMPLE, L. J., M.R.C.S. : R.S.O. at the Kent and Canterbury Hospital.

THOMPSON, C. G. K., M.B. Edin., D.P.H. : deputy M.O.H. and asst. T.O. for Gt. Yarmouth.

Middlesex County Council—The following appointments are announced :

CHAPPLE, C. F., M.B. Adelaide, F.R.C.S.E. : asst. R.S.O. at Central Middlesex County Hospital ;

BAIRD, R. C., M.R.C.S. : resident casualty officer at Redhill County Hospital, Edgware ; and

MCCLELLAND, MARGARET, M.B. Melb. : resident asst. M.O. at Central Middlesex County Hospital.

• Subject to confirmation.

Notes, Comments and Abstracts

TECHNIQUE OF DIPHTHERIA IMMUNISATION

By PERCIVAL V. PRITCHARD, M.D. Edin., M.R.C.P.E., F.R.F.P.S.G., D.P.H.
DEPUTY MEDICAL OFFICER OF HEALTH FOR ST. PANCRAS

I HAVE lately had many inquiries from doctors about the details of diphtheria immunisation and my object here is to supply the busy practitioner with some easily digested practical notes.

Every year many children die from diphtheria or are left seriously crippled by it. Babies under one year are seldom affected, but children from one to twelve years are commonly attacked, and the most dangerous period is between one and five. After this age many children develop a degree of protection or immunity in a natural way by contact with small doses of the infection.

THE SCHICK TEST

The Schick test is performed on children over five as a routine to see if a course of immunisation is necessary. It is also carried out about three months after the final injection of a prophylactic course at all ages to see whether immunity has been established. In any series of cases there is always a small percentage of failures and this test will point these out. They should, of course, be given a further course of treatment. The test is carried out as follows:

Toxin and control can be bought ready for use. Into the left forearm 0·2 c.cm. toxin is injected intradermally. Into the right forearm 0·2 c.cm. of the toxin which has been heated to destroy its specific effect is injected as a control. Readings can be made at about 48 hours in an emergency. If the result is Schick-positive it can be taken as final. A negative result at this stage is unreliable and may change to positive in the next few days. A reading seven days after the test is safest.

If there is insufficient diphtheria antitoxin present in the blood of the patient the toxin of the Schick test will give a local positive reaction resulting in redness and infiltration at the site of injection. This may begin to show itself in 48 hours. If present at all it will be there by and on the seventh day. It fades in a few days, leaving behind a faint pigmentation and some scales. When nothing happens locally the reaction is called negative. Considerable experience is required for accurate reading and Schick-testing is usually carried out at special clinics. There are two possible readings on each arm, negative (−) and positive (+). Positive results can be (+) or (++) depending on the size of the reaction. Four interpretations of these combinations are recognised.

Left (−), *right* (−)=Schick-negative. The person is immune. The test shows that his blood contains sufficient antitoxin to combat any toxin which would be produced by an attack of diphtheria.

Left (+) *or* (++), *right* (−)=Schick-positive. The person is liable to contract diphtheria. He should be given a course of immunisation to develop a supply of antitoxin in the blood.

Left (++), *right* (+)=Schick pseudo-positive. This is read as a positive reaction, the person being looked upon as susceptible.

Left (+), *right* (+)=Schick pseudo-negative. This is interpreted as a Schick-negative result.

CHOICE OF A PROPHYLACTIC

I prefer the *toxoid-antitoxin floccules* (T.A.F.). This preparation's great advantage is its freedom from unwanted reactions. It is given in three doses of 1 c.cm. each at fortnightly intervals.

Alum-precipitated toxoid (A.P.T.) was originally used for the one-shot method of immunisation. I am not going to venture into any of the bitter arguments which have been centred around this material and method. I have never favoured it because it has a reputation for causing local nodular reactions. Of late its sponsors have advocated turning it into a two-shot method with a first dose of 0·1–0·5 c.cm. depending on the age, and a second dose of 0·5 c.cm. four weeks later. Some authorities consider these doses to be too high and advise only 0·1 c.cm. and 0·3 c.cm. for children and 0·25 c.cm. and 0·5 c.cm. for adults.

Toxoid-antitoxin mixture (T.A.M.) is generally considered to be less efficient than T.A.F. or A.P.T. in the production of immunity.

Formol toxoid (F.T.) has not been used as extensively in this country as the other preparations. It is said to give a high percentage of severe reactions particularly in older children and adults. The latest advice is to give it in three doses of 0·2 c.cm., 0·4 c.cm. and 0·6 c.cm. with three weeks between the first and second doses and two weeks between the second and third.

Whatever material is used it is given intramuscularly. The makers supply literature with full instructions. I have given my views but it must be remembered that each of these preparations has its supporters. A prophylactic course does not guarantee immunity. It is therefore important that the Schick test should be carried out about three months after the last injection; otherwise from time to time immunity will be incorrectly presumed with dangerous possibilities.

COÖPERATIVE SOCIETIES AND THE SALE OF DRUGS

WHEN the Pharmacy and Poisons Act 1933 was drafted the Pharmaceutical Society agreed to a provision that a pharmacist should not conduct a branch shop where drugs were sold under unqualified management. One would suppose that, sauce for the goose being sauce for the gander, it was only right that the same principle should apply to shops belonging to persons who were not pharmacists, but it now appears that such was not the intention of the Government. It is now admitted that when the bill was in Parliament the Government and the all-powerful coöperative societies overlooked the fact that certain clauses would prevent the sale of drugs by these societies, the grocery departments of the big departmental stores and like concerns. A judgment given in 1938 by the High Court (Hygienic Stores Ltd. *v.* Coombes) declared in effect that it was useful for such traders to sell drugs in grocery departments. Since this interpretation the Government have informed the Pharmaceutical Society that it was not intended by them to prevent, by the 1933 act, the sale of drugs in the grocery sections of such concerns and they have now intimated that the act ought to be amended by a provision to the effect that where drugs (other than Part 1 poisons) are sold "on registered premises incidental to and as a subsidiary part of a business of a different class carried on by the authorised seller of poisons, nothing in sections 8, 9, and 10 of the act shall require such sale of drugs to be under the personal control of a registered pharmacist subject to the observance of the following conditions: (*a*) that the drugs are sold in closed containers as closed by the manufacturer or other person from whom they were obtained; (*b*) that no drugs are compounded or dispensed on the premises; and (*c*) that no title, emblem or description, the use of which is restricted by section 3, is used in connexion with the business carried on in these premises." The whole question was reviewed at the society's January council meeting and it was decided to ask the Home Office to receive a deputation from the council to discuss the matter further on the basis of this proposed amendment. From the fact that the Government are desirous of a settlement in war-time it may be assumed that they regard the question as an urgent one.

THE LANCET CROSSWORD: LAST WEEK'S SOLUTION

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